MOORED CURRENT METER AND CTD OBSERVATIONS FROM BARROW STRAIT 2001-2002

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Le titre exact des rapports statistiques figure au-dessus du résumé de chaque rapport. Les rapports statistiques sont résumés dans la base de données *Résumés des sciences aquatiques et halieutiques*.

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Les établissements de l'ancien secteur des Sciences et Levés océaniques dans les régions et à l'administration centrale ont cessé de publier leurs diverses séries de rapports en décembre 1981. Vous trouverez dans l'index des publications du volume 38 du *Journal canadien des sciences halieutiques et aquatiques*, la liste de ces publications ainsi que le dernier numéro paru dans chaque catégorie. La nouvelle série a commencé avec la publication du rapport numéro 1 en janvier 1982.

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Abstract

Pettipas, R., J. Hamilton, and S. Prinsenberg. 2005. Moored current meter and CTD observations from Barrow Strait, 2001-2002. Can. Data Rep. Hydrogr. Ocean Sci. 166 : v + 118 p.

Nine instrumented moorings deployed in the eastern end of Barrow Strait from August 2001 to August 2002 provide yearlong records of current, ice drift, temperature and salinity that extend a data time series started in August of 1998. Current data collected with Acoustic Doppler Current Profilers and specialised instrumentation for near-pole direction measurement, are presented as contour plots of both bihourly and low-pass filtered observations. Results of a tidal analysis of the current data are also presented. Temperatures, salinities and densities obtained from moored CTDs are displayed as time series plots for both bihourly and low-pass filtered data, and as power spectra. Statistical results include means, extrema and standard deviations of all measured parameters.

Résumé

Pettipas, R., J. Hamilton, and S. Prinsenberg. 2005. Moored current meter and CTD observations from Barrow Strait, 2001-2002. Can. Data Rep. Hydrogr. Ocean Sci. 166 : v + 118 p.

Entre août 2001 et août 2002, une batterie de neuf stations instrumentales ancrées dans l'embouchure est du détroit de Barrow a enregistré des données sur le courant, la dérive de la glace, et la température et la salinité de l'eau. Ces douze mois de données prolongent une série analogue débutée en août 1998. Nous présentons les cartes de contour des observations prises à toutes les deux heures par des profileurs de courant à effet Doppler et des instruments spécialisés pour la mesure des directions près du pôle. Nous présentons également des cartes de contour de ces mêmes données après leur lissage. Nous faisons l'analyse de marée des données sur le courant. Nous présentons les graphiques des données aux deux heures et des données lissées de la température, de la salinité et de la densité, mesurées avec les sondes CTP ancrées, ainsi que leur spectre de fréquence. Nous donnons les résultats statistiques suivants : les moyennes, les extrêmes et les écarts-types de tous les paramètres mesurés.

Introduction

A field program to quantify and examine the inter-annual variability of the exchange through Barrow Strait (a principal pathway between the Arctic and North Atlantic Oceans), and more generally, to improve our understanding of the circulation within the Arctic Archipelago, was started by BIO investigators in August of 1998. Data from the first 3 years of this study, along with a description of the methods used, have previously been reported [Hamilton et al., 2004, 2003, 2002]. Described here are moored instrument data from the fourth year of the study.

Yearlong records of current rate and direction, ice drift, temperature, salinity and density from Barrow Strait are presented as unfiltered and low-pass filtered time series plots along with relevant statistical summaries for each season. CTD data are also presented as power spectra. Results of tidal analyses give tidal amplitudes, phase and ellipse orientation as a function of depth for each of the 5 main tidal constituents (K1, M2, O1, S2, P1). Separate tidal analyses have been done for a 5 month period of solid ice cover and a 6 week period of open water.

Finally, hydrographic sections at the eastern and western ends of Barrow Strait, and across Wellington Channel are presented. These cross-sectional diagrams are created from a 35 station CTD survey conducted during each field study.

Mooring Locations and Description

A total of 9 instrumented moorings were distributed over 4 sites across the eastern end of Barrow Strait (see Figure 1). Three moorings were located at the 150 m contour on the south side, 2 moorings were halfway between this Southern site and the center of the strait (the "South Central" site), 2 moorings were in the middle of the Strait (the Central site), and 2 moorings were at the 200 m contour on the north side. An illustration of the moorings deployed is shown in Figure 2. The mooring distribution is different

than in the previous 3 years of this study when instrumentation was concentrated at only 2 sites; the 200 m contour on the Southern and Northern sides. The change was made to improve spatial resolution, and was possible because of additional instrumentation brought to the project. The Southern site was also moved closer to shore (from the 200 m to the 150 m contour) in an attempt to better capture the center of the intensified flow along the Southern coast.

Acoustic Doppler Current Profilers (ADCPs) and precision heading references were mounted in streamlined buoyancy packages to provide current rate and direction information. The technique used to obtain reliable direction measurements here, where conventional compass technology is inadequate due to the proximity of the site to the magnetic pole, is described in detail by Hamilton [2001]. These upward looking ADCPs logged average speeds from 100 pings over a 5 minute on-period every 2 hours, and also provided a simultaneous ice drift speed over the yearlong deployment. Concurrent direction measurements were logged separately with the precision heading reference system, and have been merged with the ADCP speed data for presentation here. All 5 ADCP/compass systems were successfully recovered, and provided good quality data for the entire deployment period.

SeaBird MicroCat CTDs were used to measure temperature, conductivity and pressure at targeted depths of 40, 80 and 160 m across the Strait, as well as the near-bottom at the Southern and South-Central sites. These CTDs recorded a single temperature, conductivity and pressure every hour. All 13 were recovered and provided complete records for the entire deployment period. Post-deployment calibration revealed good stability over the yearlong deployment.

Data Processing

Current Speed and Direction Data

The ADCPs were mounted in streamlined buoyancy packages (A2 "SUBs" manufactured by Open Seas Inc.) and set up to measure current relative to the instrument

axes, ignoring their own compass information. Instruments were set up to average over a depth interval of 4 m. Typically, the highest useful depth average in the data sets from the 4 upper ADCP instruments was centered around 10 m. Current data above this level were rejected based on RDI's standard echo intensity quality criterion. These acoustic Doppler current profilers also record ice drift velocity when there is solid or near-solid ice cover.

Direction was provided using an independent compass package mounted in the A2 tail to give the orientation of the ADCP relative to magnetic north. Initiation of a compass sample cycle was triggered by the commencement of the bihourly ADCP measurement by making use of RDI's "RDS3 interface" to provide a turn-on pulse to the compass. The compass was programmed to take a 30s sample in the middle of the 5 minute ADCP sampling interval. This conserved compass battery power, and took advantage of previous experience that current direction does not change significantly over 5 minutes at the study location [Hamilton et al., 2003].

Direction records were then adjusted for the variation in magnetic declination using magnetic observatory data from the NRCAN observatory in Resolute to get direction relative to true north.

Vertical excursions of the ADCPs caused by current drag forces acting on the mooring were small. For the four ADCP/pole compass systems moored at the targeted 80 m depth, the largest standard deviation in the depth over the year was 0.68 m for the ADCP mooring at the south-central site, with the bulk of the variance accounted for by tidal height variation. There were only a few occasions where mooring dip was greater than 3 m, with the maximum observed being 6 m. Corrections for mooring dip have been applied where necessary using depth information from the moored CTDs, so that reported current speeds are at the correct absolute depth.

Moored CTD Data

SeaBird MicroCat CTDs were set up to measure temperature, conductivity and pressure every hour for the yearlong deployments. Moorings supporting the upper CTDs

were subjected to the greatest dip due to current drag forces acting on the mooring. The greatest dip was seen at the Southern site with an observed maximum of 7 m. For this CTD the standard deviation in instrument depth over the yearlong deployment was 0.6 m, with tidal height variation accounting for about 1/3 of this variation.

Low-Pass Filtering

Some of the data series presented have been filtered to remove the semidiurnal and diurnal tides using the technique described by Godin (1972). The technique uses three simple averaging filters applied in sequence. Godin, working with hourly observations, recommends two consecutive applications of a filter that averages over 24 samples, followed by one that averages over 25 samples. Here, the hourly MicroCat CTD data have been decimated to match the bihourly sampling of currents, and averaging filters of 12 and 13 samples are then applied to all the data sets.

Tidal Analysis

Harmonic tidal analyses of current data using Foreman's (1978) method is presented separately for a 5 month period of solid ice cover, and a 6 week period of broken or no ice, for each site. The tidal ellipse axes amplitudes, orientations and phases for the main tidal constituents (K1, M2, O1, P1 and S2) are plotted as a function of depth.

The periodic vector function describing a particular constituent, traces an ellipse over a tidal cycle with major and minor amplitudes defined by the length of the semi-major and semi-minor axes. The major axis amplitude is always positive. The sign of the minor axis amplitude defines the rotation sense of the current ellipse. When positive the vector traces the ellipse in a counter-clockwise direction; when negative, the rotation sense is clockwise.

Ellipse orientation is the angle measured counter-clockwise from east to the semi-major axis.

The phase is a measure of the timing of high water referenced to astronomic positions over the Greenwich meridian. Phase is measured counter-clockwise from this chosen reference.

Data Presentation

Yearlong time series of hourly temperature, salinity and density from the moored CTDs are shown in Figures 3 - 6. As in previous years [Hamilton et al., 2004, 2003, 2002], warming and freshening of the top 50 m occurs in summer. This freshening is seen at all sites, although not as strongly at the new South-Central and Central sites. Temperatures in the upper water column drop to near-freezing values in mid-fall, but salinity increases until January as salt is rejected from the growing pack ice. Evidence of the penetration of warmer, saltier Baffin Bay water is seen in the records from the deep ctd at the South Central site. One of the moorings on the Northern side of the strait start was deployed a month after the rest of the array, resulting in the late start for some of the records in Figure 6.

Power spectra of the moored CTD measurements (Figures 7-10) reveal a diurnal tidal signal with greatest variance in salinity/density at near-bottom and top instruments at the South Central and Northern sites, while at the Southern site the greatest variance is seen at mid-depth. (In previous years, the Southern site was further offshore at the 200 m contour, and the strongest diurnal signal there was from the deep instruments.) A weaker semi-diurnal tidal signal is also evident in the records; particularly at the southern site.

Current data are shown as contour plots in Figures 11-18. Data from the deep and mid-water ADCPs at the Southern site have been combined. Data are presented in along-strait and cross-strait components, where positive values are defined as flow towards 105° true and 15° true, respectively. Figures 11-14 display a month of unsmoothed data in which a strong tidal signal is apparent. Low-pass filtered data (tides removed) are shown in Figures 15-18. Mean flow is predominantly eastward at the South and South-central sites throughout the year. At the central site mean flows are near zero until winter, and then eastward through to the following summer. At the Northern site,

flow direction is westward in late summer and fall, and then weakly eastward for the rest of the year.

Smoothed temperature, salinity and current data (where available) are shown for each moored CTD level in Figures 19-31. Tables 1 through 24 provide a summary of the CTD and ADCP data at the CTD depths, with statistics computed over each season, and for the entire year. Density has been included in these statistical summaries.

The strong seasonality in the 32 m level salinity and alongstrait current at the Southern site, diminishes moving northward to the South Central and Central sites. At the Northern site, there is again a strong seasonal signal in salinity and alongstrait current, but here the current regime is different than at the Southern and South Central sites, with westward flow through summer and fall, and weak eastward flow through winter and spring. At the Central site, mean upper current is westward in the early fall, but with a late-fall eastward flow, the fall average is close to zero.

Annual and seasonal mean flows are summarised in Figures 32-37. Each 4 m binned value from the ADCP is shown. Some discontinuity at the 70 m level in the Southern site records is a result of merging records from 2 ADCPs separated by ½ km on different moorings. There is a stronger vertical shear in the bottom half of the water column at the new Southern site (150 m contour) compared to that seen in previous years when the Southern site was further offshore at the 200 m contour. At the other 3 sites, a single ADCP measured currents in the top 70 m of the water column only.

In late summer and fall, the magnitude of the easterly flow in the upper water column is progressively less moving northward to the South Central and Central sites, and westward on the North side. In winter and spring, flow is eastward right across the strait with quite similar values (5 to10 cm/s) at all but the Northern site where flow speed is less (2 to 5 cm/s), but also eastward.

The variance in the bihourly, and low-pass filtered current data for the yearlong ADCP records are shown in Figure 38. On the south side, tides account for only half of the total variance in the along-strait current speeds, but at the Central site the portion due to tides is about 80%.

Tidal analysis results for the ADCP data collected at all 4 sites are presented as profiles for the 5 largest tidal constituents in figures 39 – 58. Separate analyses have

been done for ice-free and solid ice periods. The magnitude of the K1 constituent at the new Southern site (150 m contour) constituent is less than observed in previous years at the 200 m contour, and 30-40% less than that observed this year at the South-central (Figure 44) and Central (Figure 49) sites. Ellipse orientations are generally along-strait as expected. Tidal constants are summarised in Tables 25 - 29.

Ice velocities through the year at each of the 4 sites were derived from the upper ADCPs, and are shown in Figures 59 - 62. Since the ice drift measurement quality is degraded by the presence of open water, there are periods in the time series where no data are presented. The manufacturer's suggested data quality standards have been applied to the ice drift data. An additional criterion applied here is that where the magnitude of the "error velocity" for a particular ensemble is greater than 1 cm/s, the ice drift velocity estimate and the adjacent estimates are rejected.

Ice started forming in October right across the Strait, and stopped moving by the start of March, except at the Southern site where movement stopped a month earlier. Break-up commenced in early July simultaneously across the strait, within a week of the observed break-up in previous years.

A station map for the August 2002 ship-based CTD survey is shown in Figure 63. Results appear as contoured sections in Figures 64 – 66. At the Eastern Barrow Strait Line (Figure 64) geostrophic flow is eastward on the South side, and westward on the North side as in previous years. At the western end, geostrophic flow is eastward across most of the Strait (Figure 65). The 3 northernmost stations on this line were missed due to heavy ice conditions. In Wellington Channel, 2 stations at the eastern end were missed due to instrument problems, but the data collected indicate a northward geostrophic flow in the western part of the channel (Figure 66). This is similar to the observations made in 2000, but in 1998 and 1999 the CTD surveys indicated a southward flow on the western side.

Acknowledgements

We thank Kumiko Azetsu-Scott and Peter Jones for their reviews of this report, and Lorne McKee (NRCAN) for providing the Resolute Observatory magnetic declination data.

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Godin, G, 1972. *The Analysis of Tides*. Liverpool: Liverpool University Press, 264pp.

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Hamilton, J. M., 2001. Accurate Ocean Current Direction Measurements Near the Magnetic Poles, in *Proceedings of the Eleventh (2001) International Offshore and Polar Engineering Conference*, 656-660. ISOPE: Stavanger, Norway.

Figure 1. **A map of the work area showing the location of the mooring sites (the open boxes), and the hydrographic survey lines (the dashed lines).**

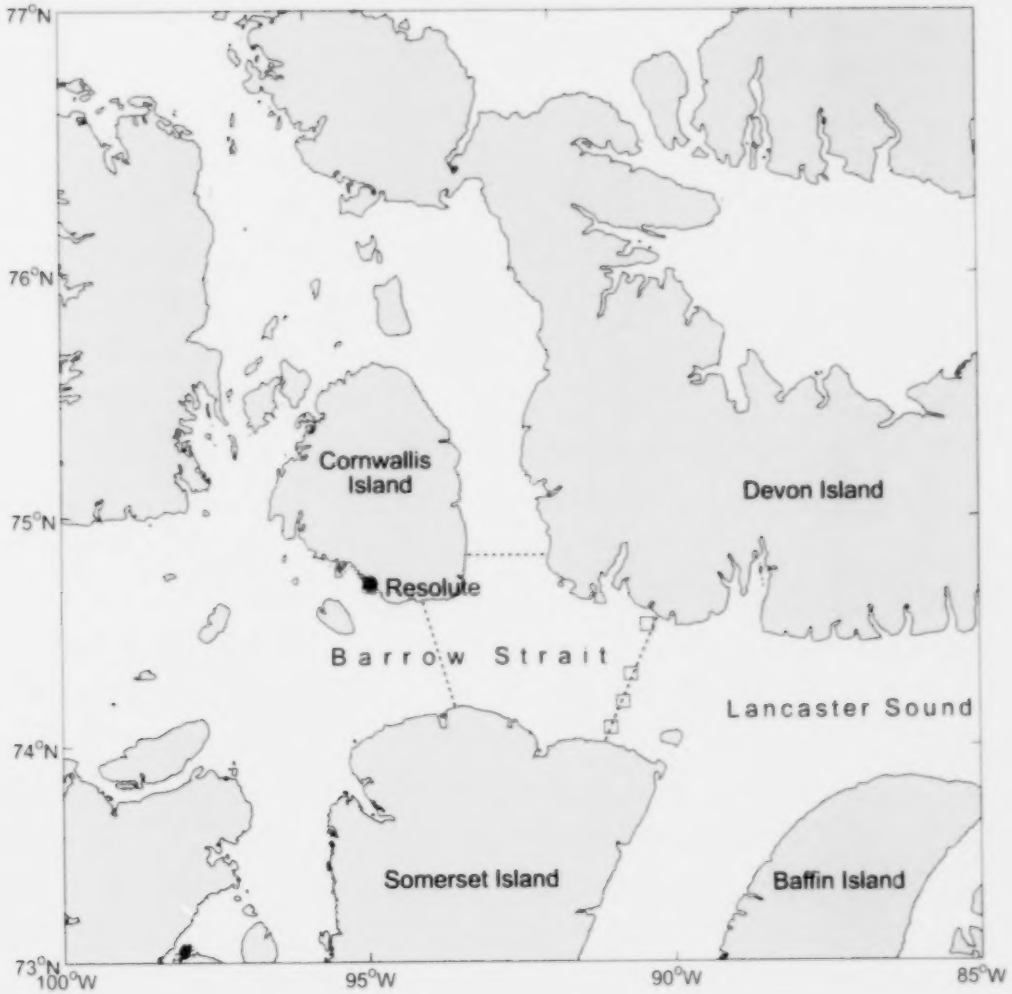


Figure 2. **Illustration of the instrumented moorings.**

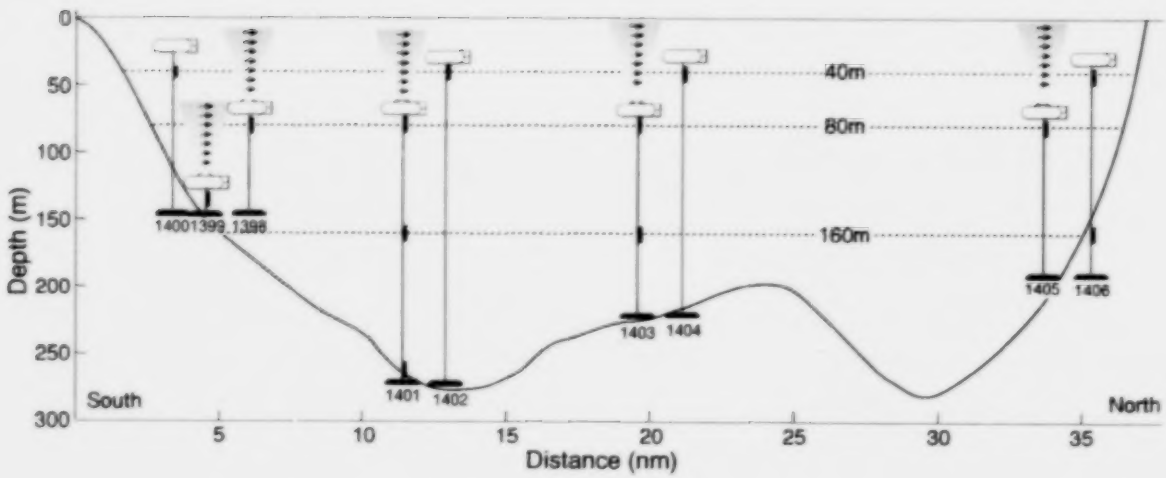


Figure 3 - **Moored hourly CTD data from the South side of Barrow Strait: August 2001 - August 2002**

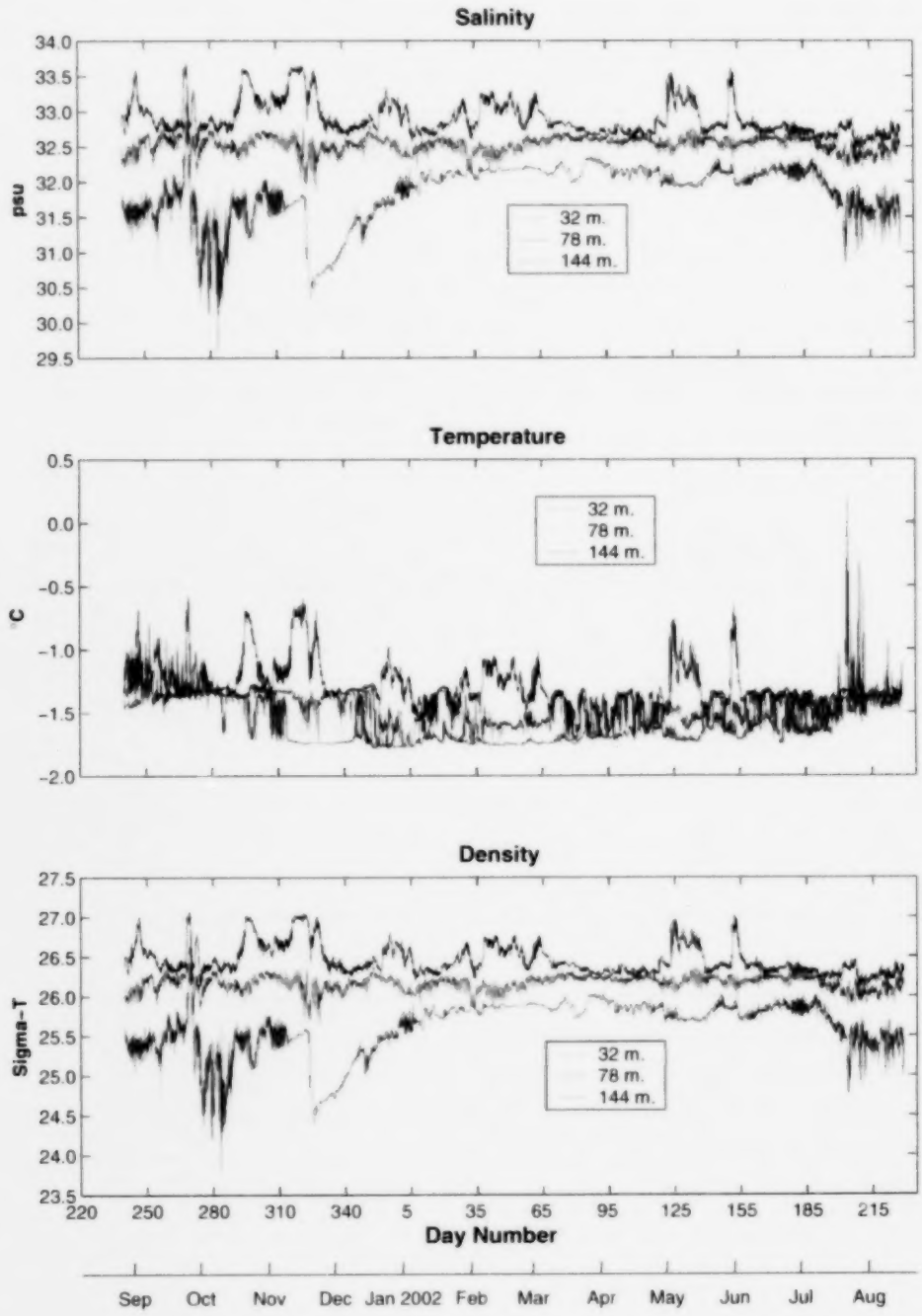


Figure 4 - Moored hourly CTD data, South-central Barrow Strait
August 2001 - August 2002

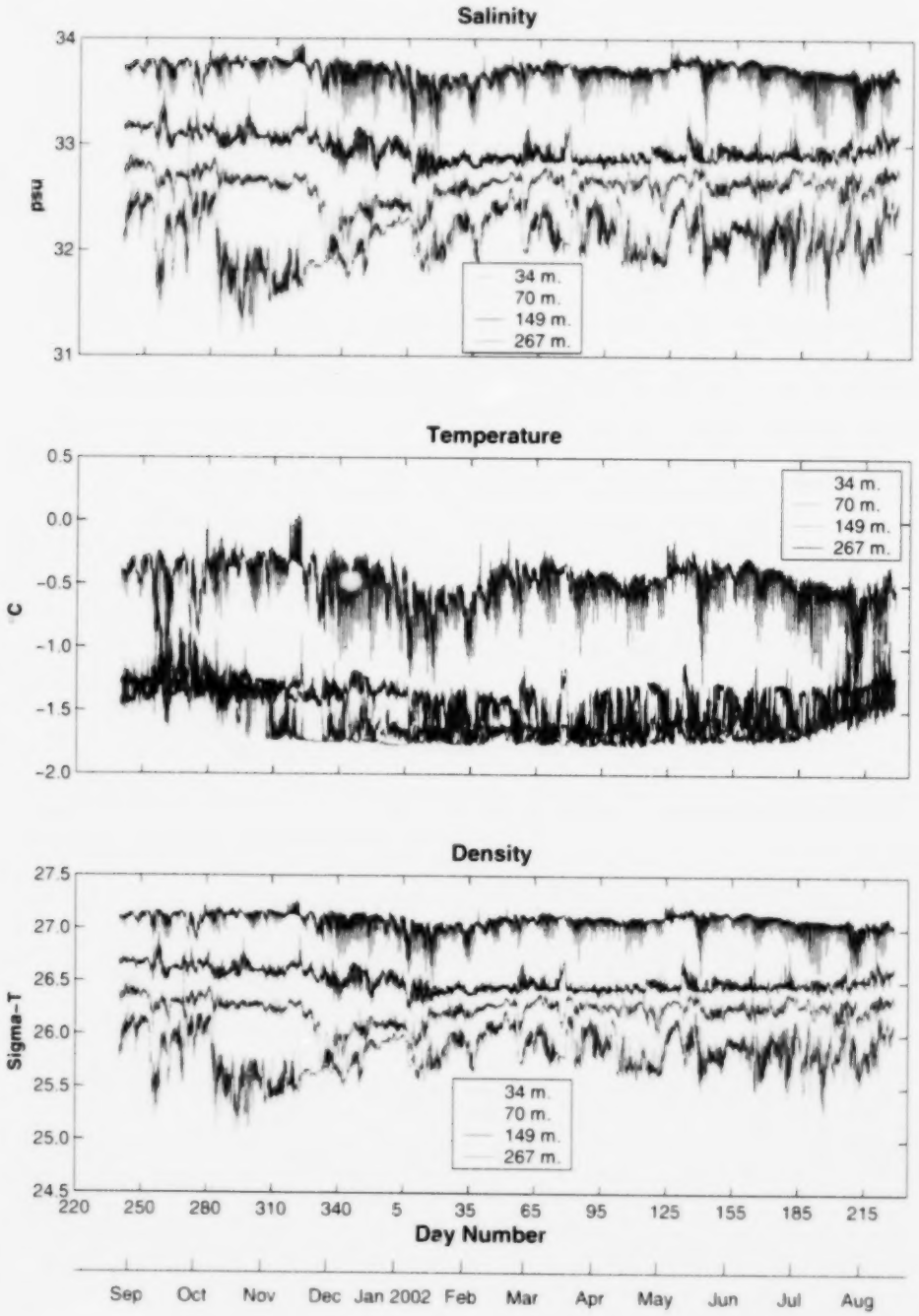


Figure 5 - Moored hourly CTD data, Central Barrow Strait: August 2001 - August 2002

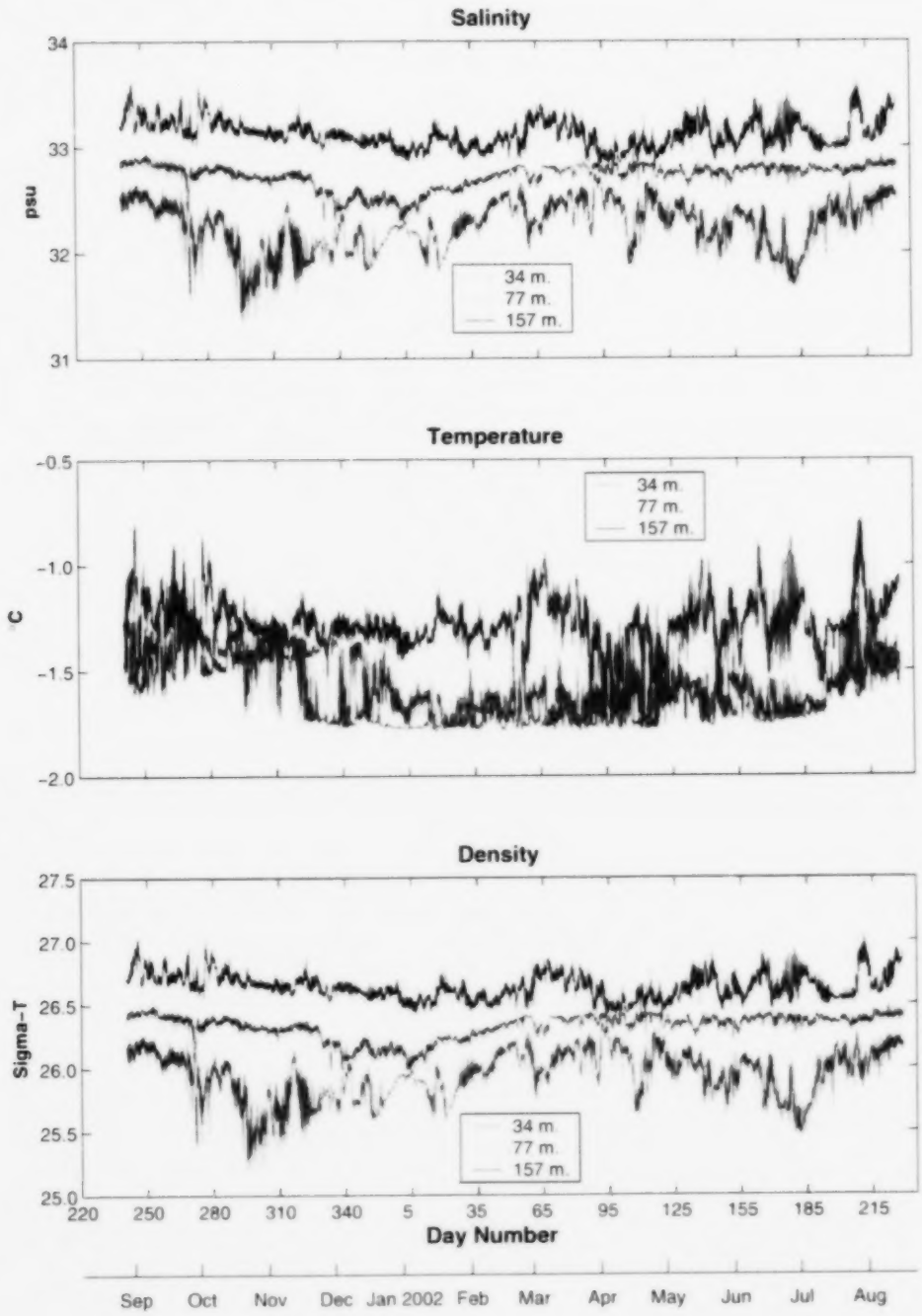


Figure 6 - Moored hourly CTD data from the North side of Barrow Strait: August 2001 – August 2002

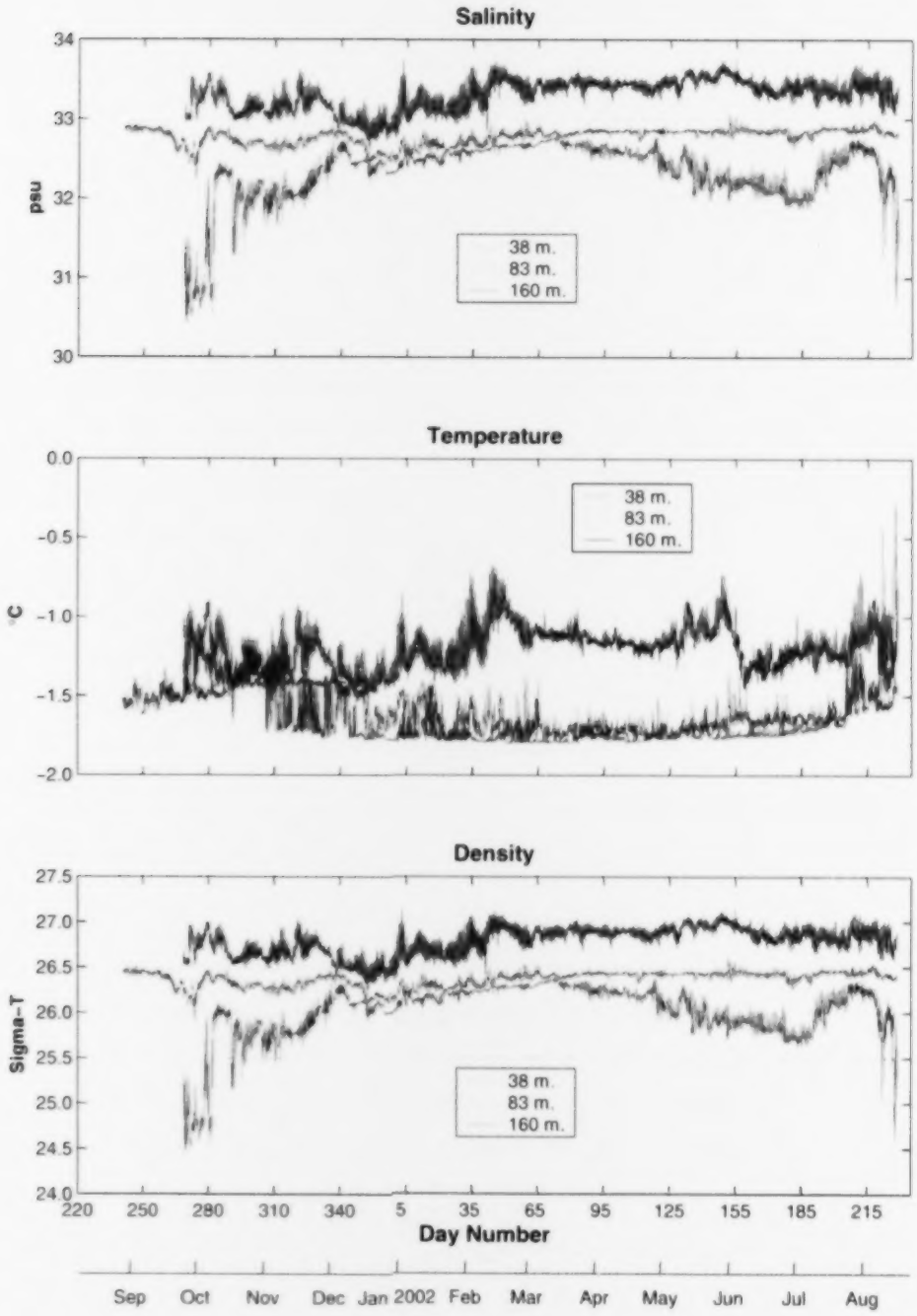


Figure 7 – Power Spectra of moored bi-hourly CTD data from South Side of Barrow Strait: Aug 2001 – Aug 2002.

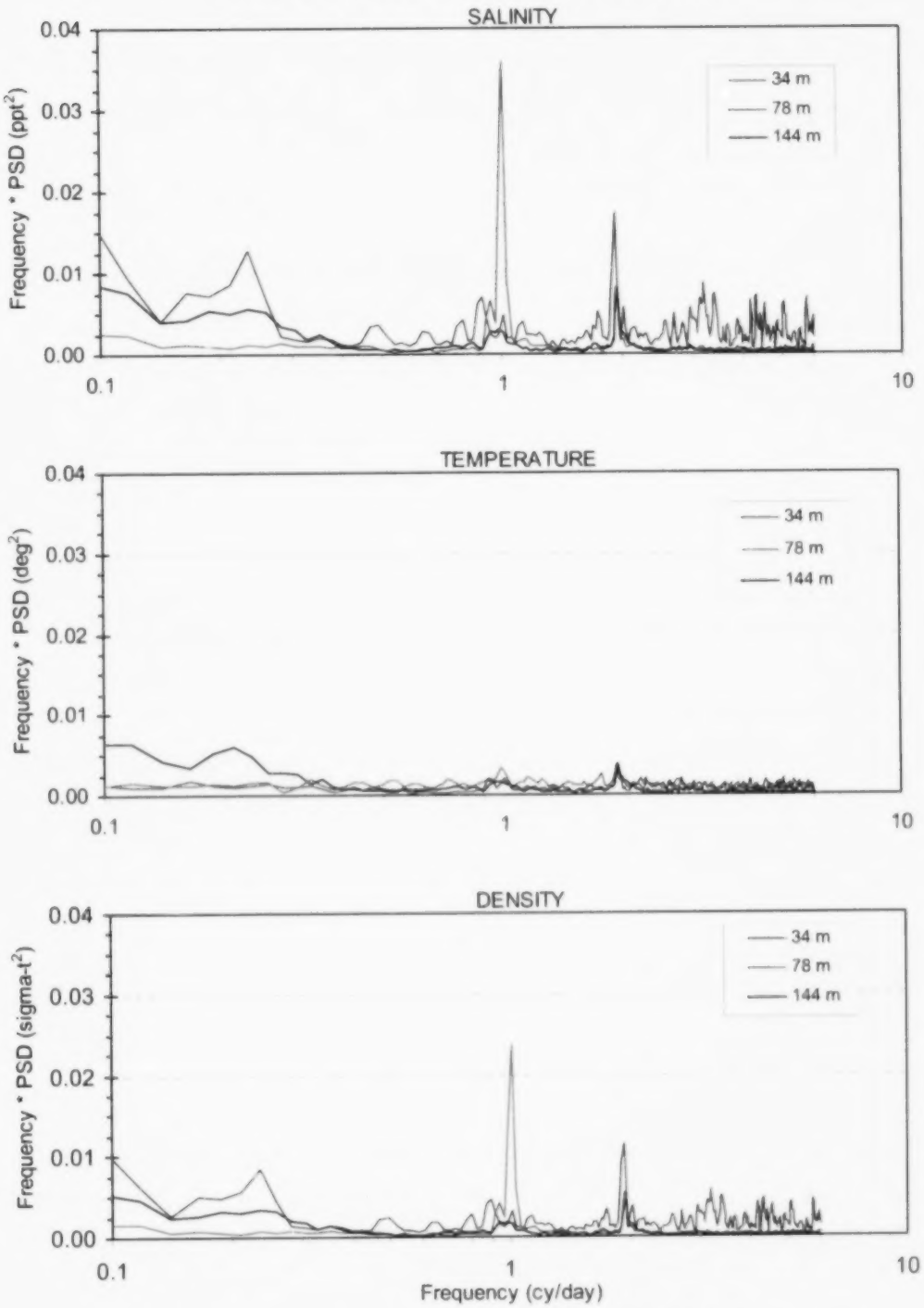


Figure 8 – Power Spectra of moored bi-hourly CTD data from

South-central Barrow Strait: Aug 2001 – Aug 2002.

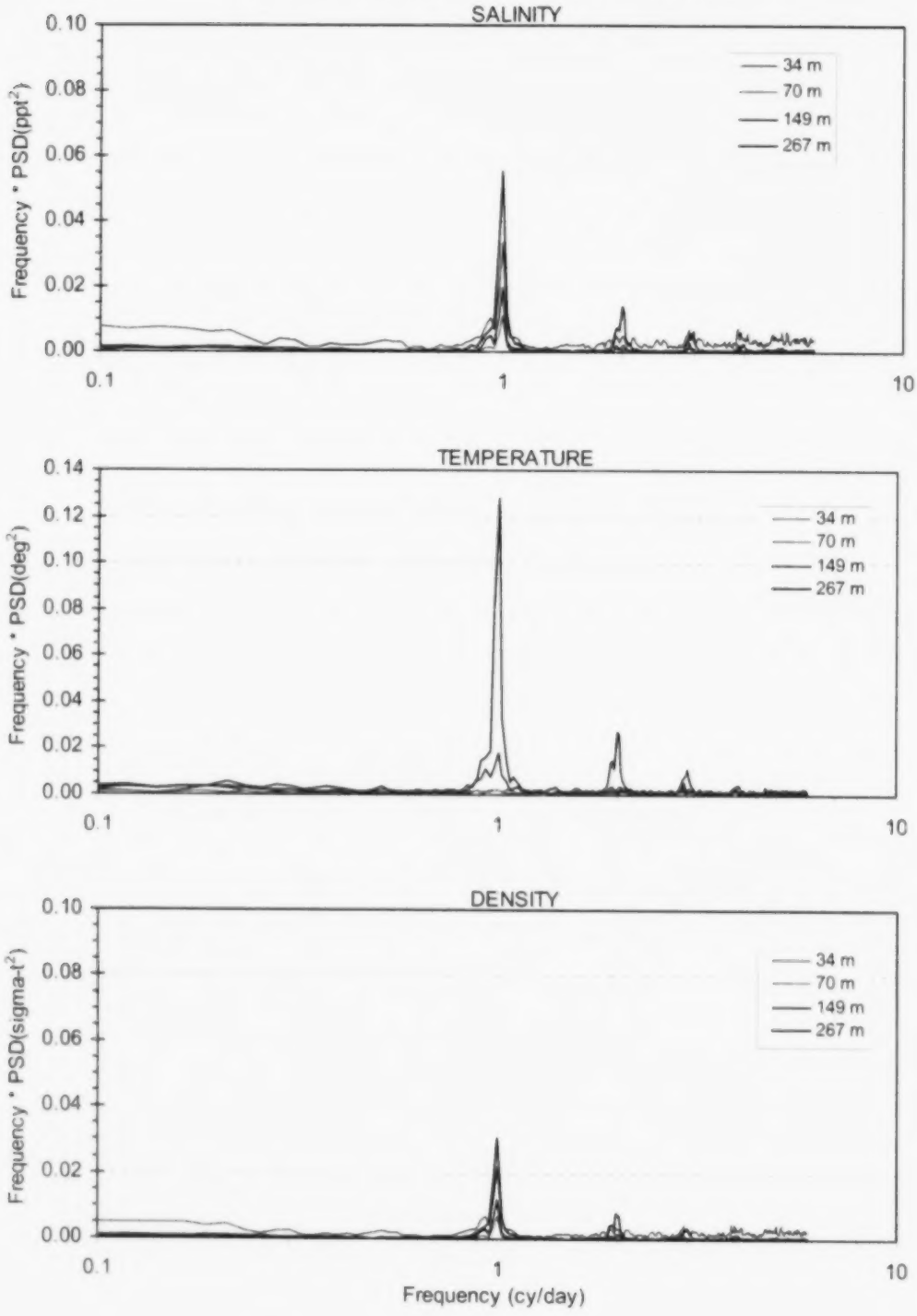


Figure 9 – Power Spectra of moored bi-hourly CTD data from Central Barrow Strait: Aug 2001 – Aug 2002.

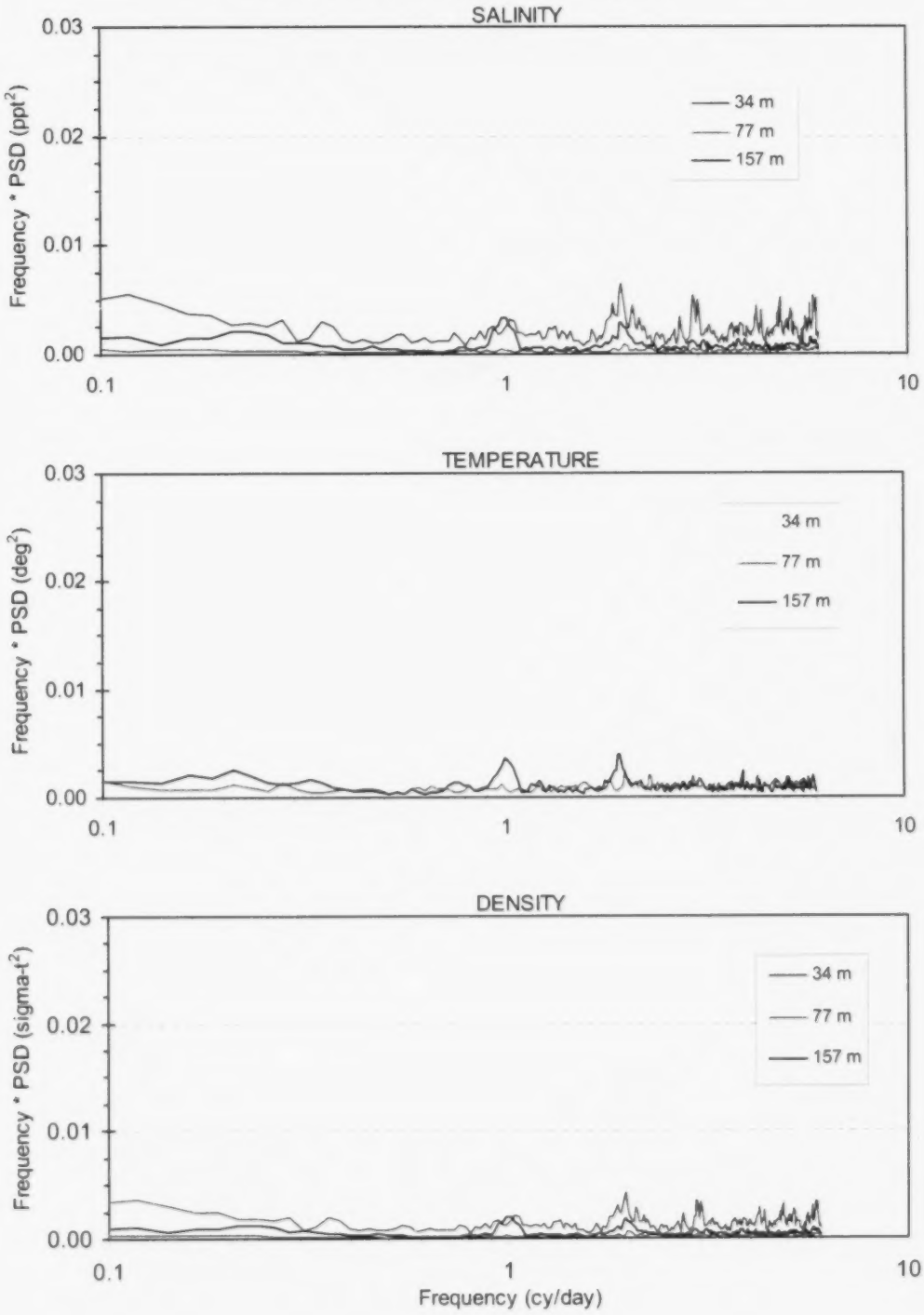


Figure 10 – Power Spectra of moored bi-hourly CTD data from North Barrow Strait: Sep 25, 2001 – Aug 2002.

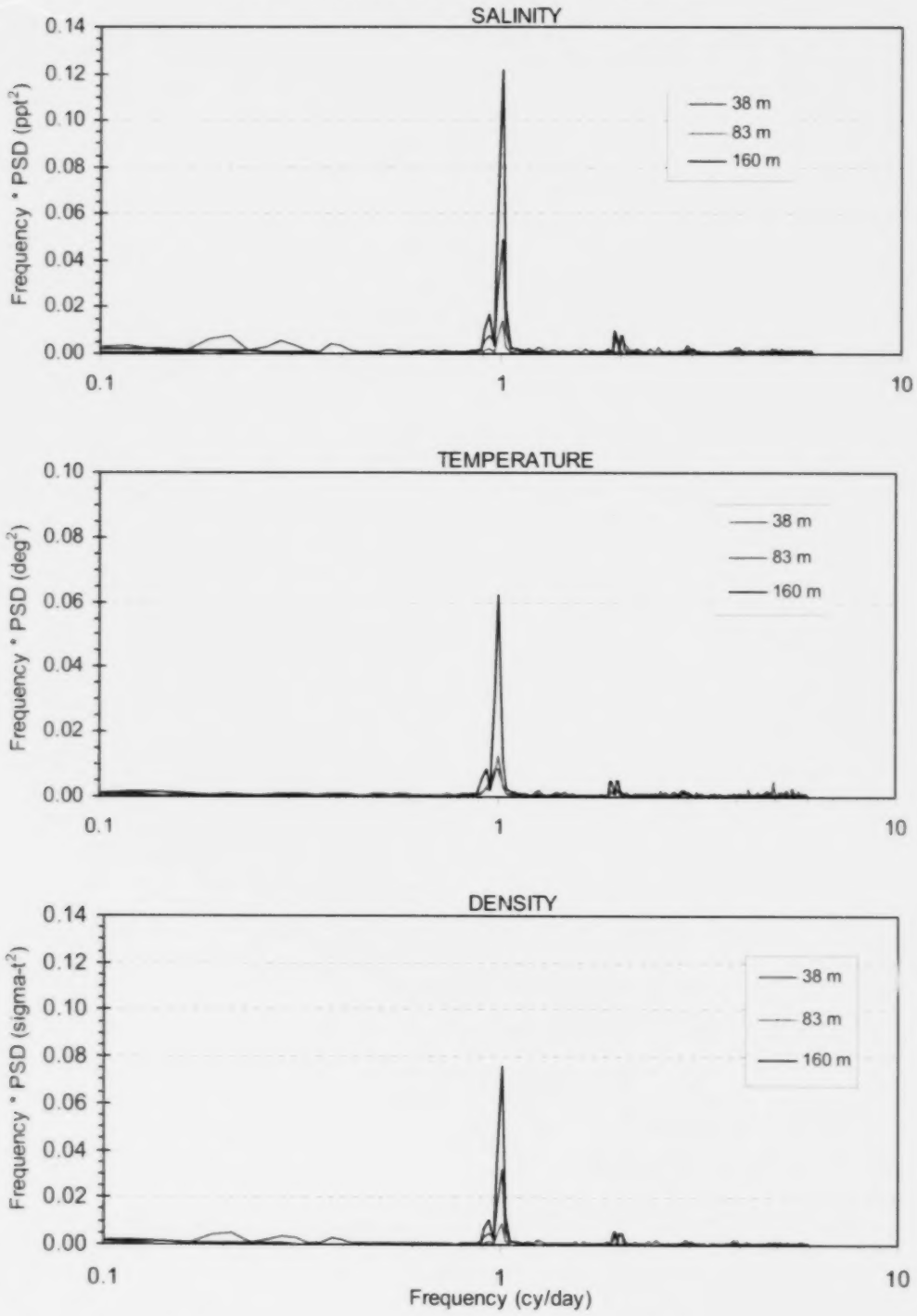


Figure 11 - Bihourly current data, South side of Barrow Strait
Sept 1, 2001 - Sept 30, 2001

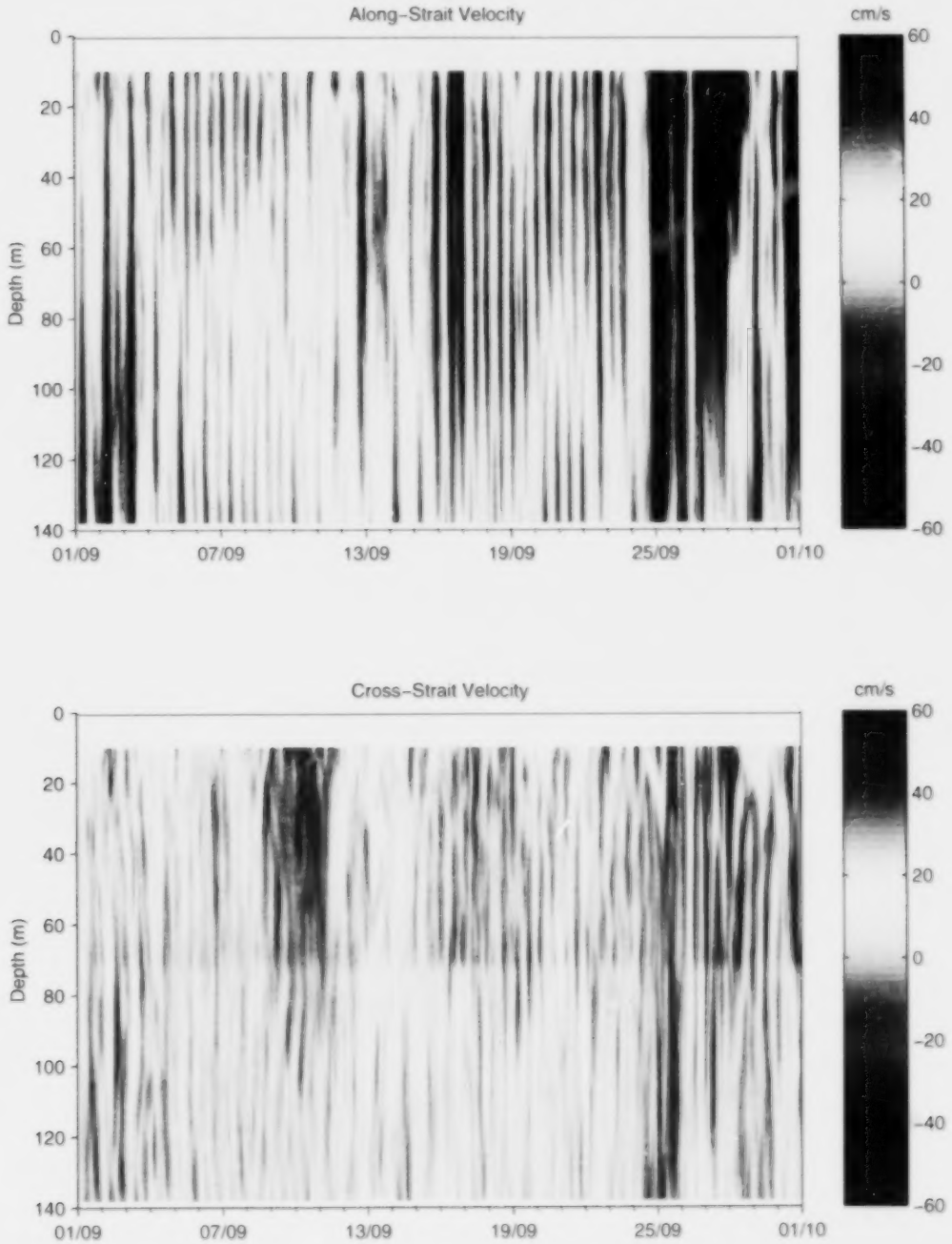


Figure 12 - Bihourly current data, South central Barrow Strait
Sept 1, 2001 - Sept 30, 2001

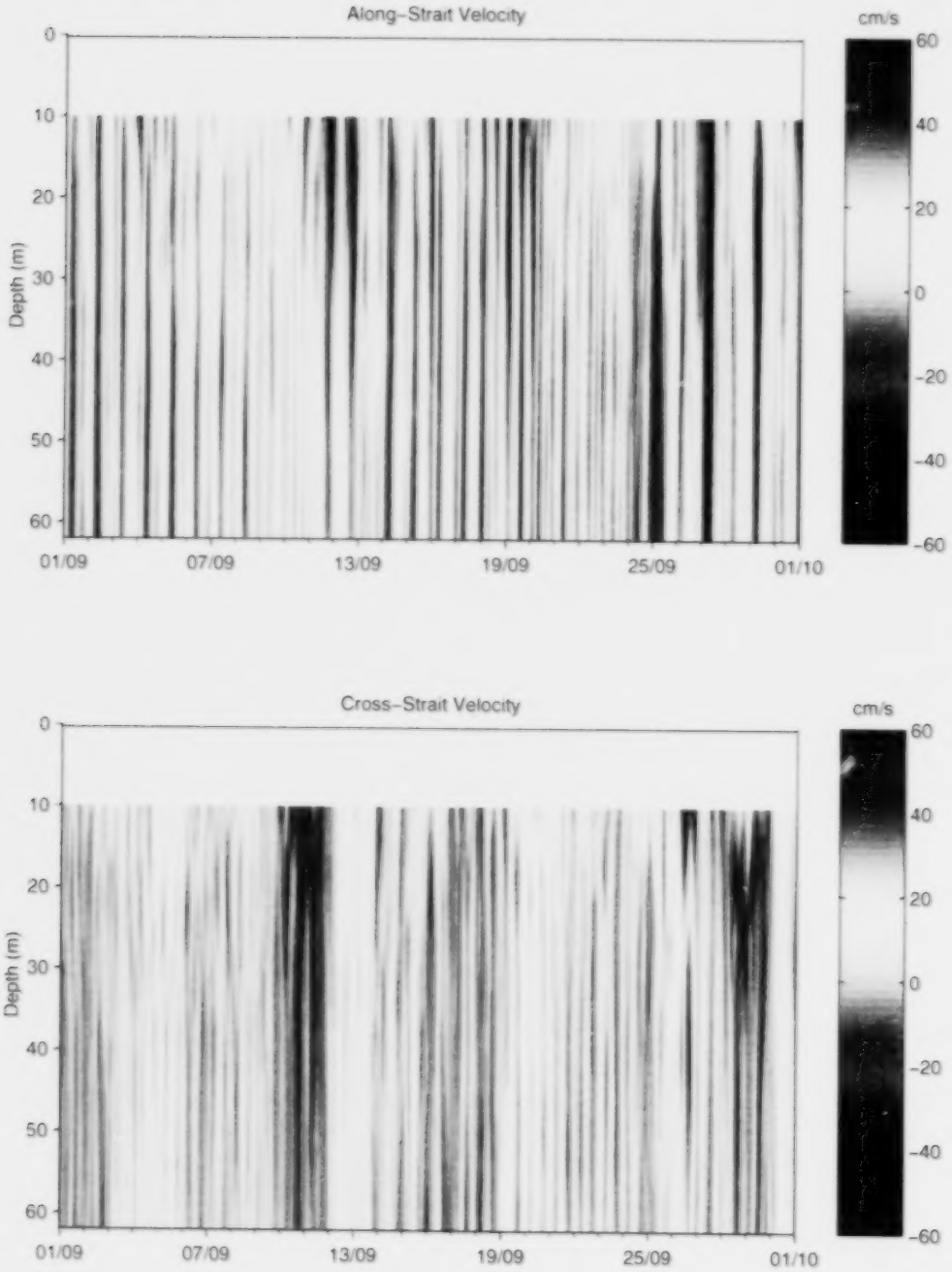


Figure 13 - Bihourly current data, Central Barrow Strait
Sept 1, 2001 - Sept 30, 2001

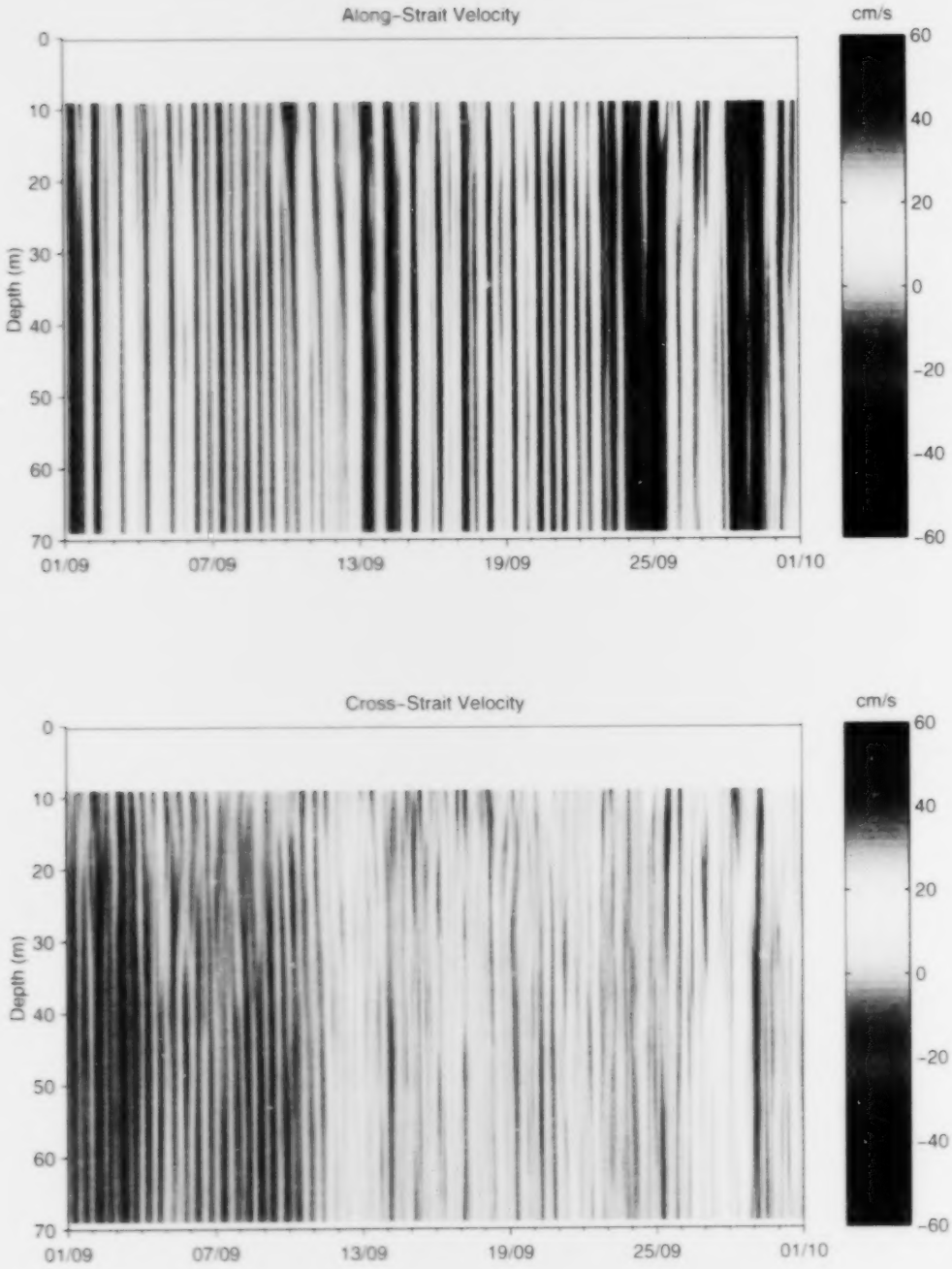


Figure 14 - Bihourly current data, North side of Barrow Strait
Sept 1, 2001 - Sept 30, 2001

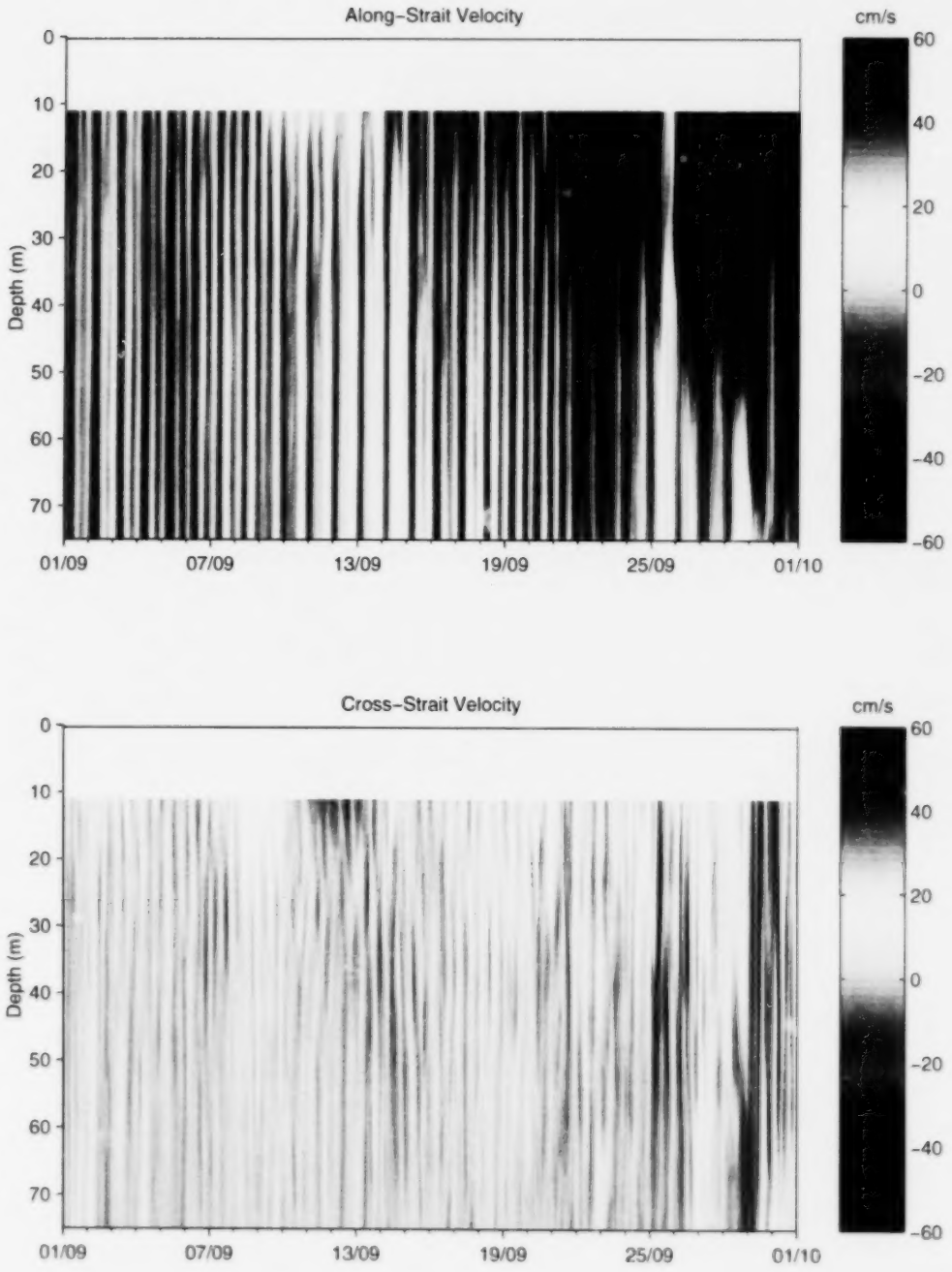


Figure 15 - Low-pass filtered currents, South side of Barrow Strait
August 2001 - August 2002

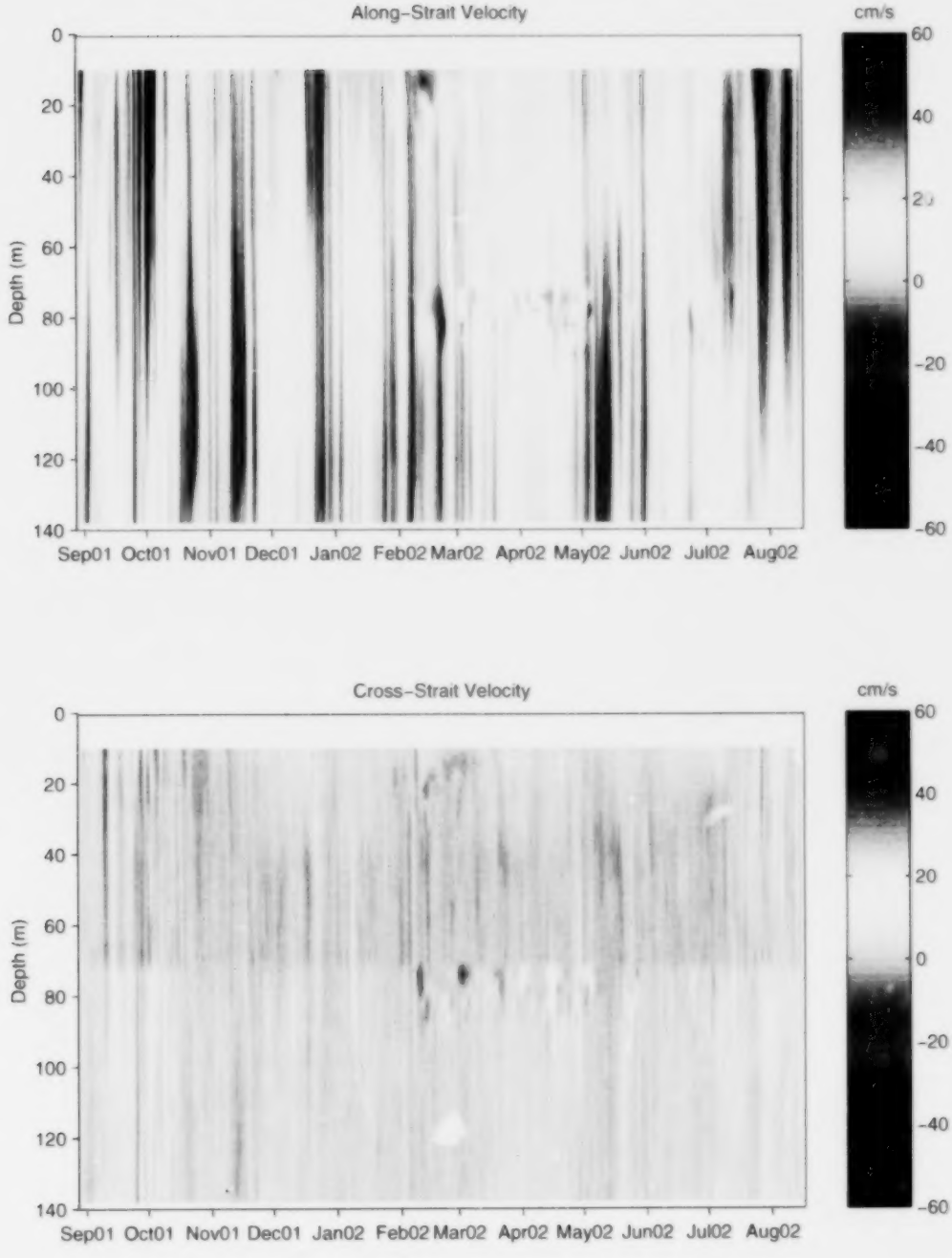
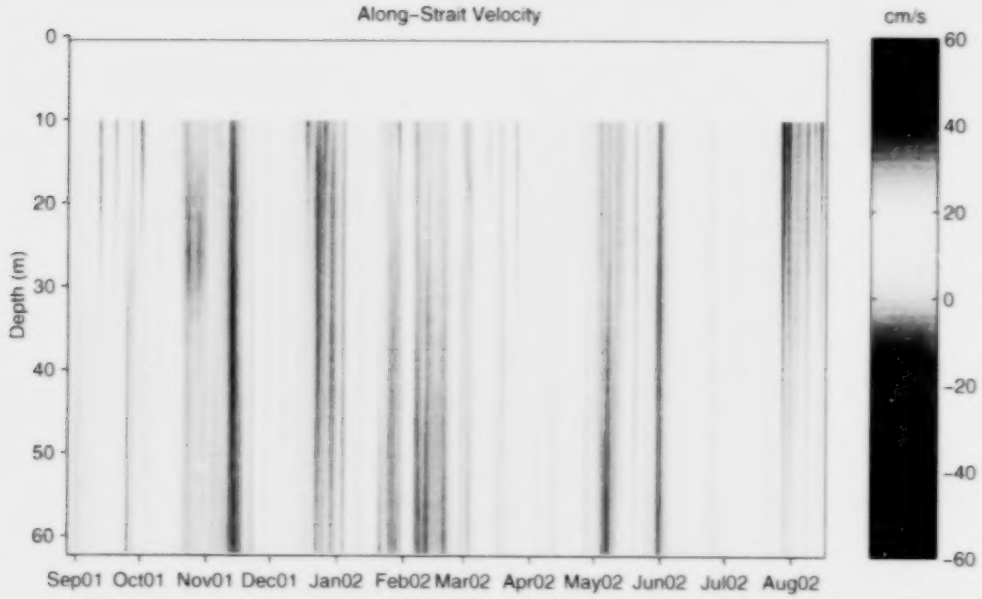


Figure 16 - Low-pass filtered currents, South central Barrow Strait
August 2001 - August 2002



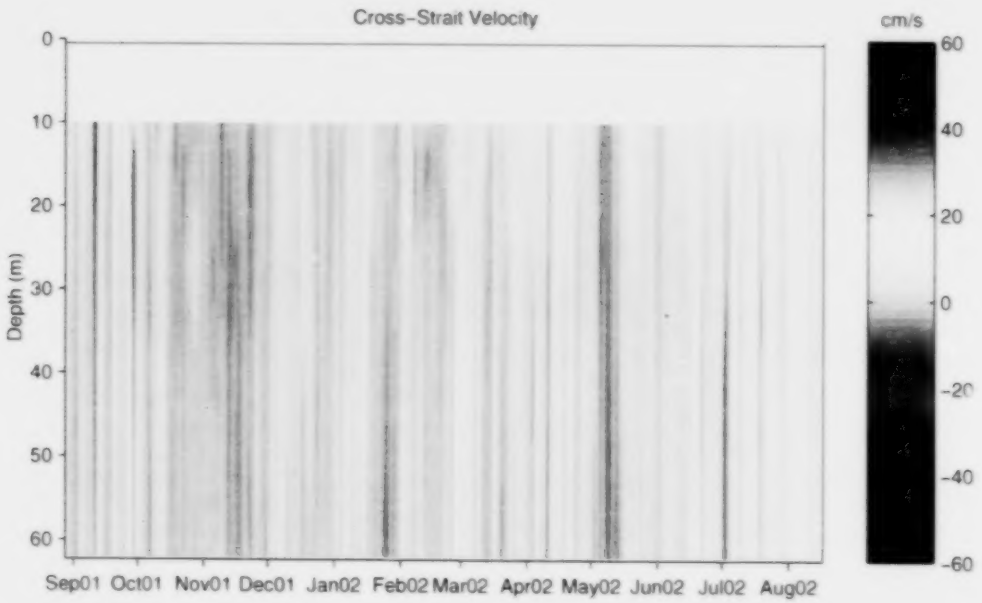
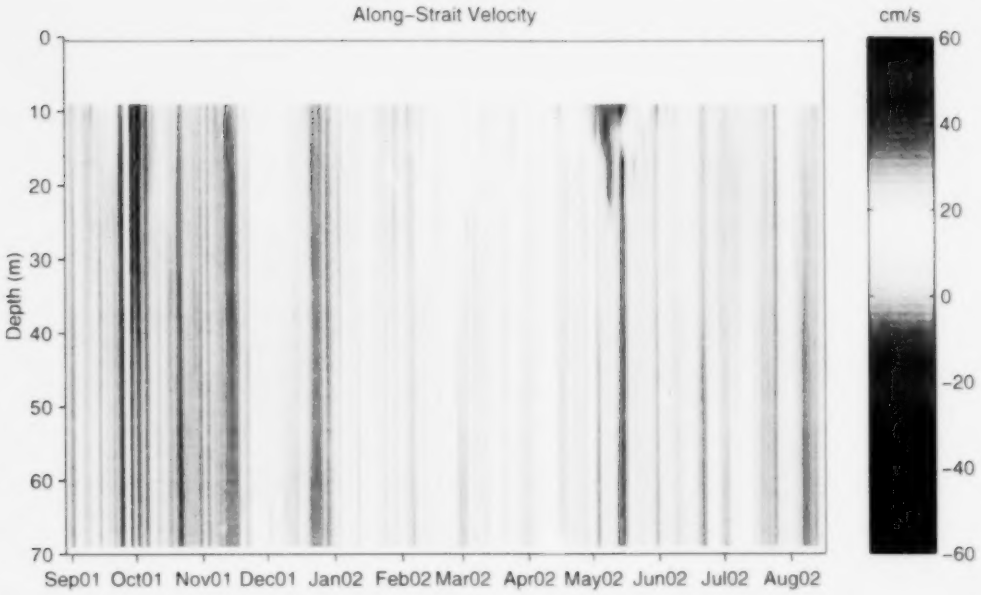


Figure 17 - Low-pass filtered currents, Central Barrow Strait
August 2001 - August 2002



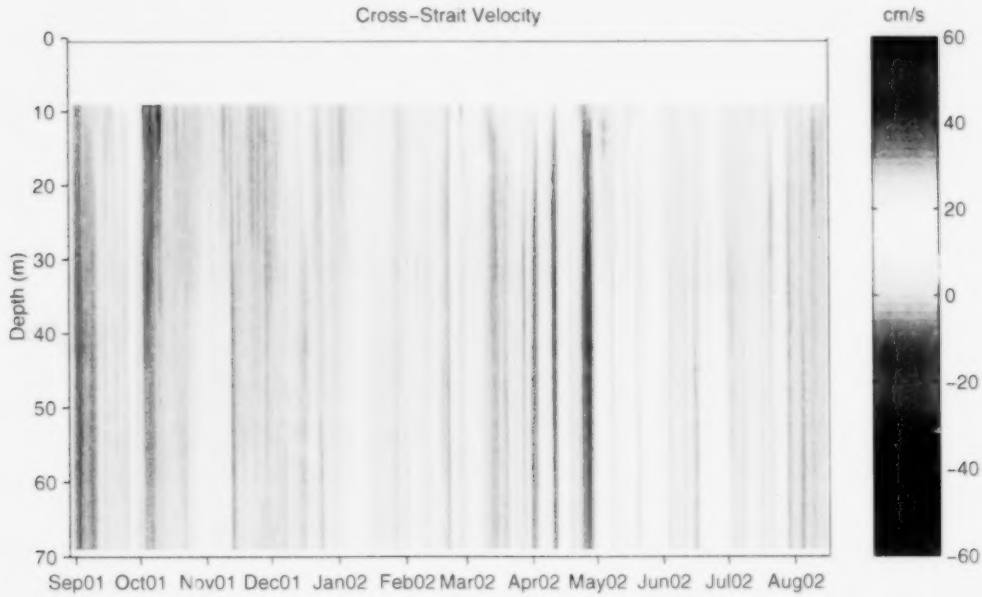


Figure 18 - Low-pass filtered currents, North side of Barrow Strait
August 2001 - August 2002

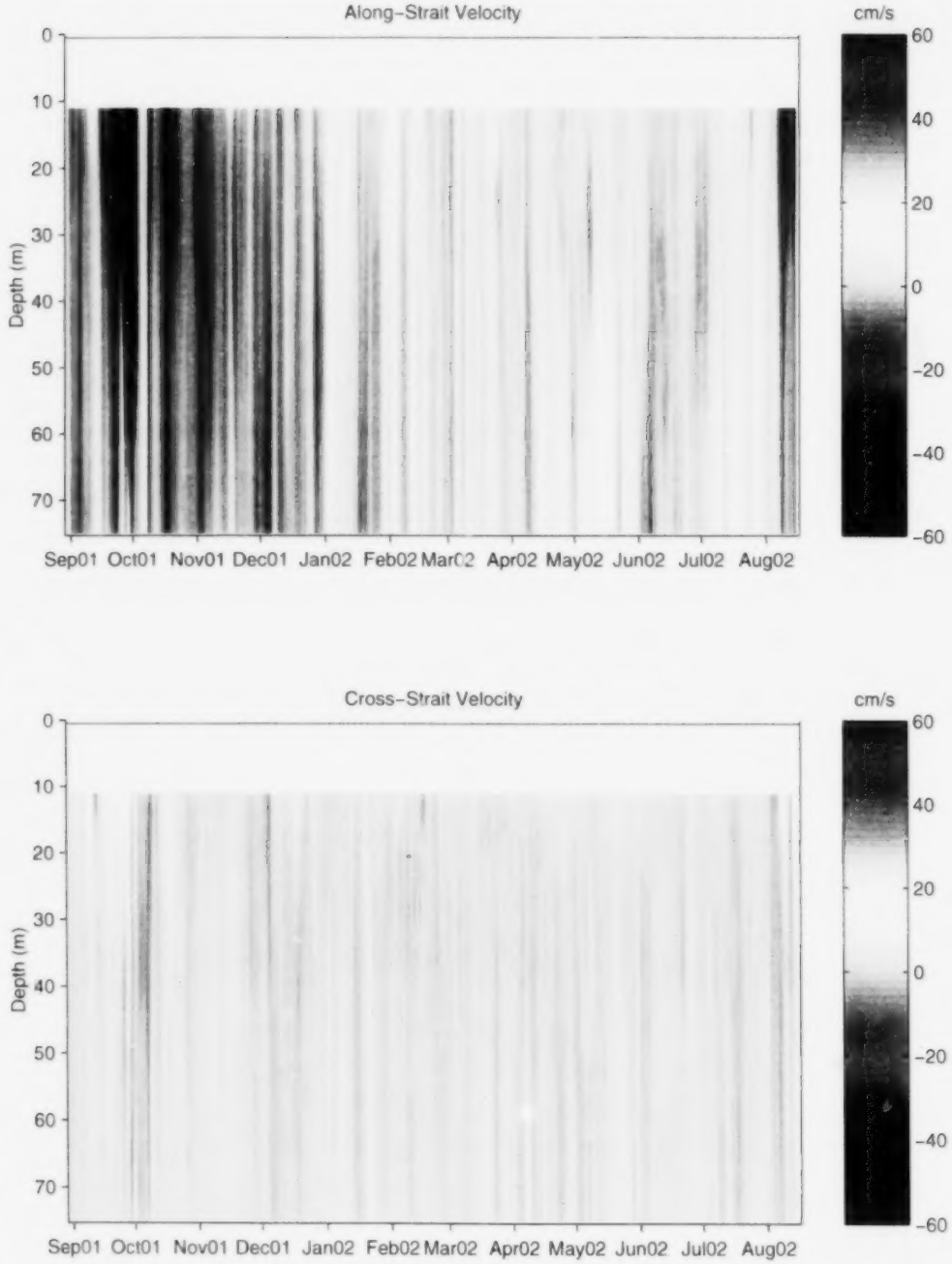


Figure 19 - Low-pass filtered T,S (32 m.) and current data (30 m).
South side of Barrow Strait: August 2001 - August 2002.

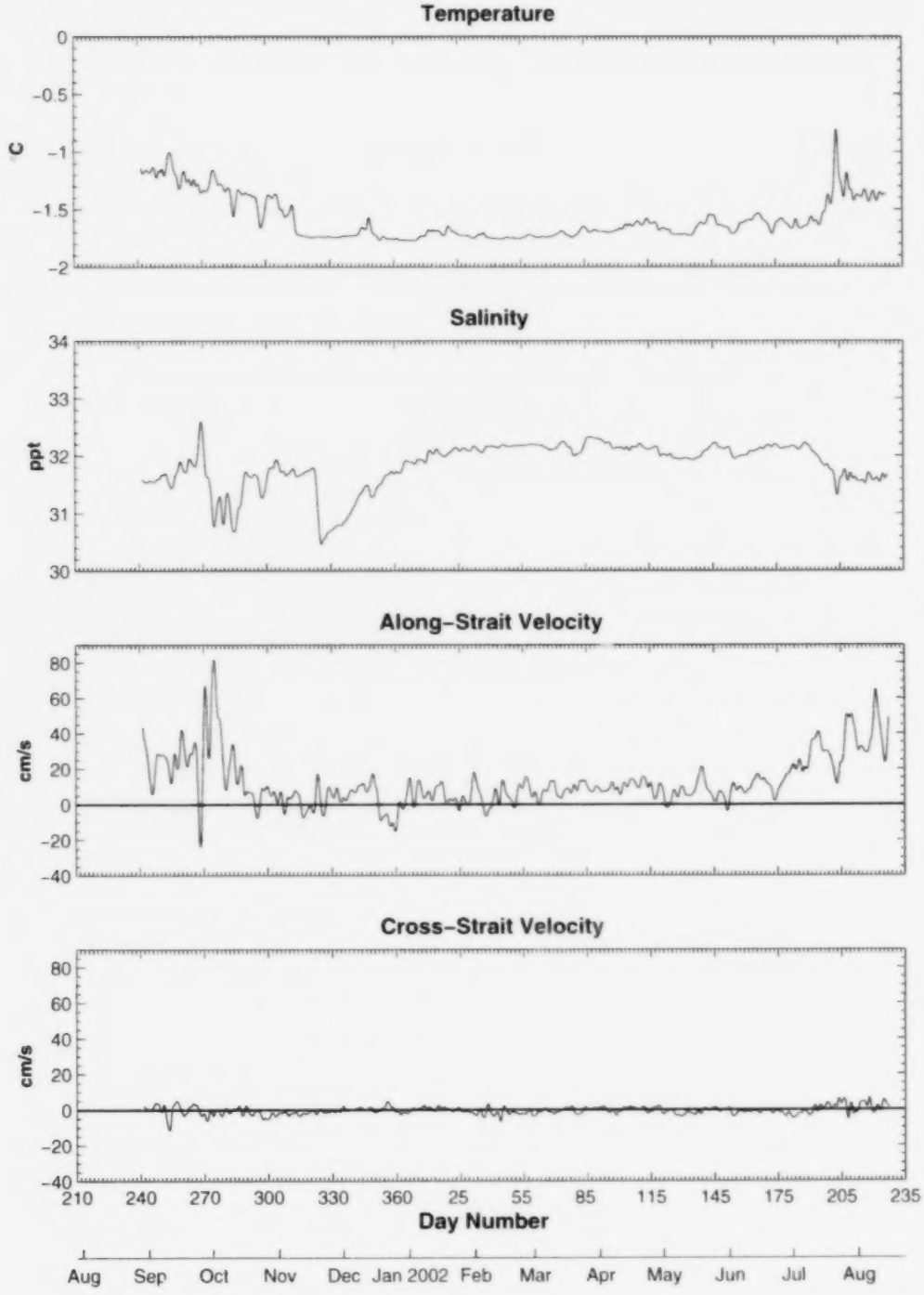


Figure 20 - Low-pass filtered T,S (78 m.) and current data (70 m.).
South side of Barrow Strait: August 2001 - August 2002.

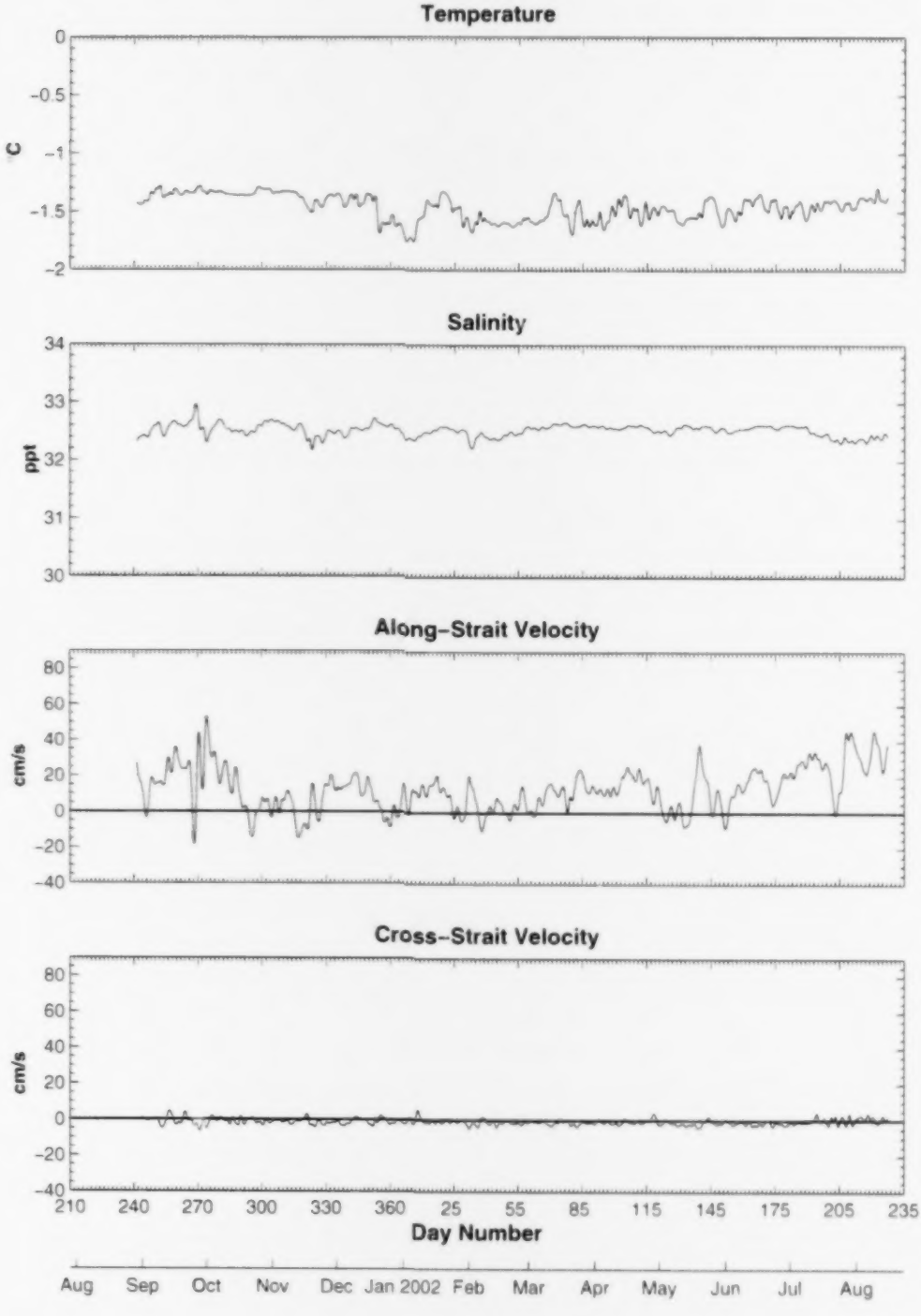


Figure 21 - Low-pass filtered T,S (144 m.) and current data (136 m.).
South side of Barrow Strait: August 2001 - August 2002.

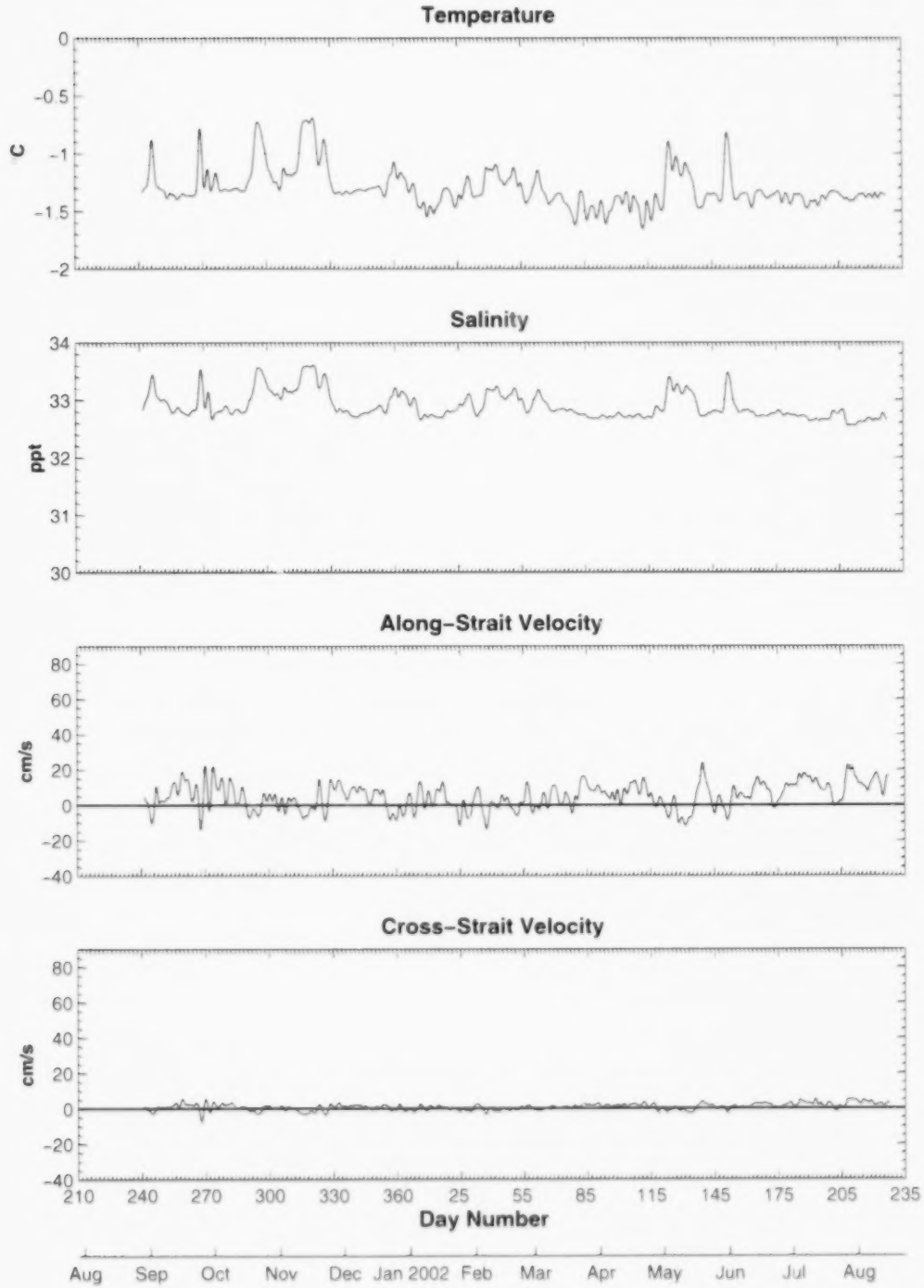


Figure 22 - Low-pass filtered T,S (34 m.) and current data (34 m.).
South-central Barrow Strait: August 2001 - August 2002.

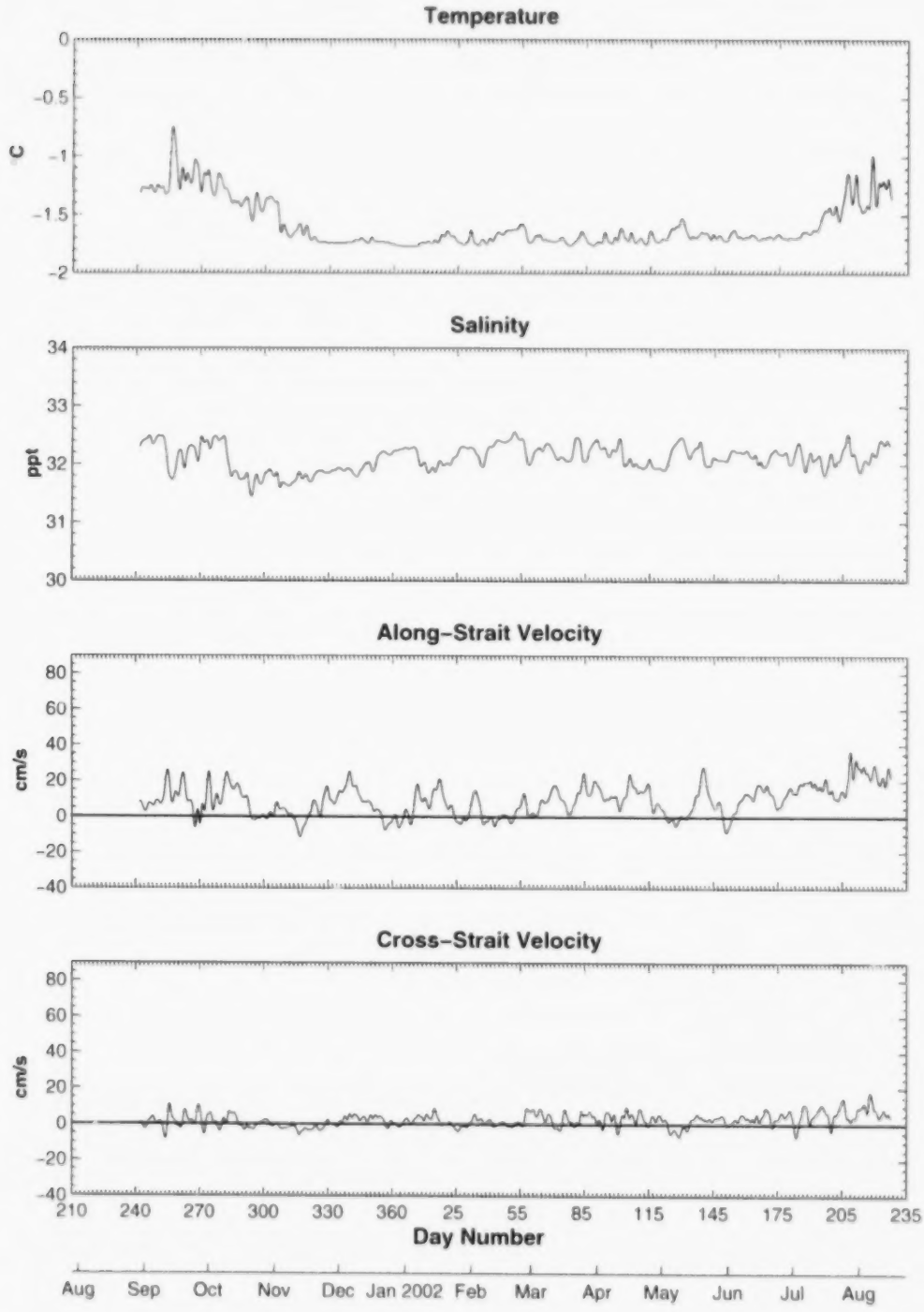


Figure 23 - Low-pass filtered T,S (70 m.) and current data (62 m.).
South-central Barrow Strait: August 2001 - August 2002.

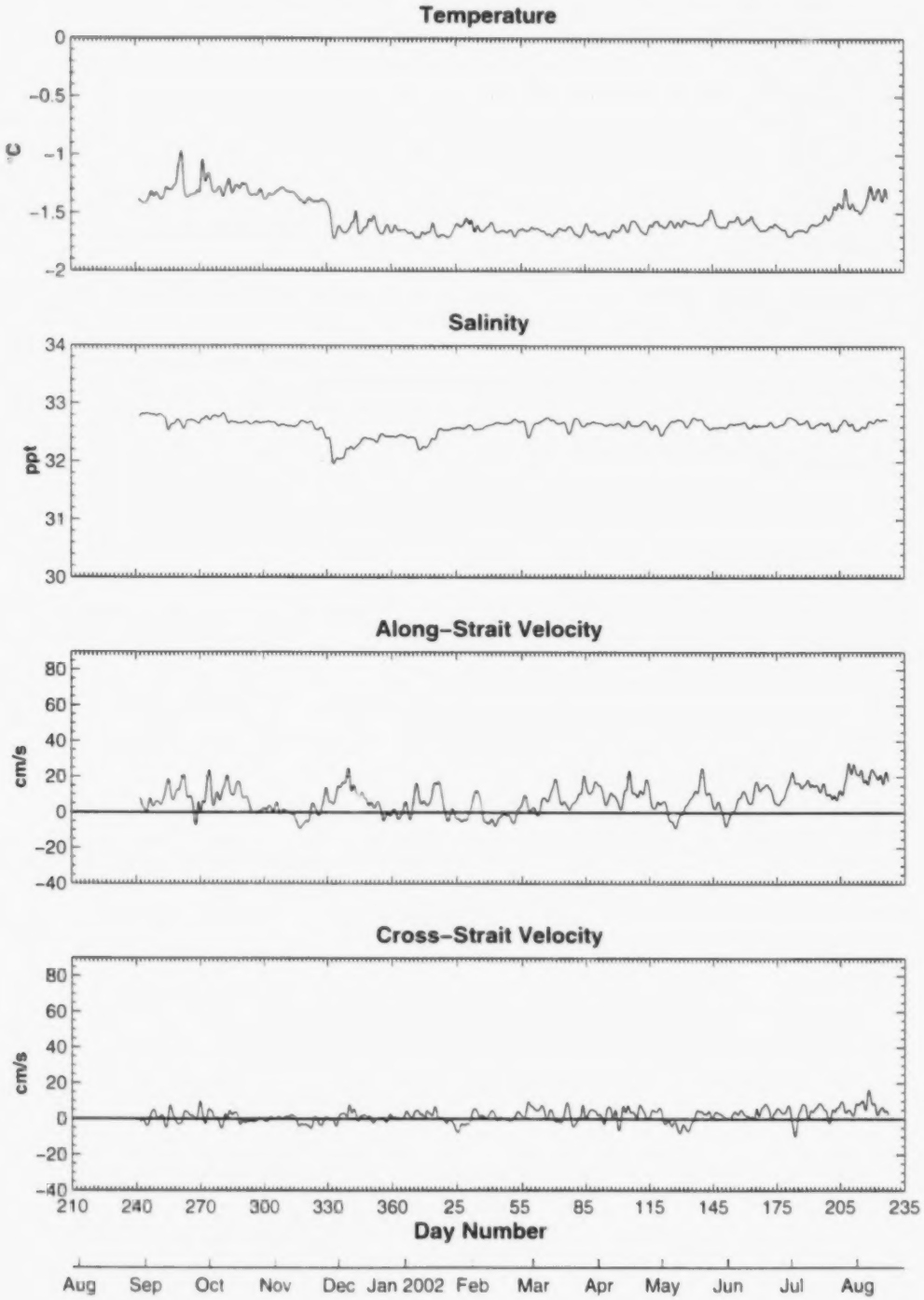


Figure 24 - Low-pass filtered T,S (149 m.)
South-central Barrow Strait: August 2001 - August 2002.

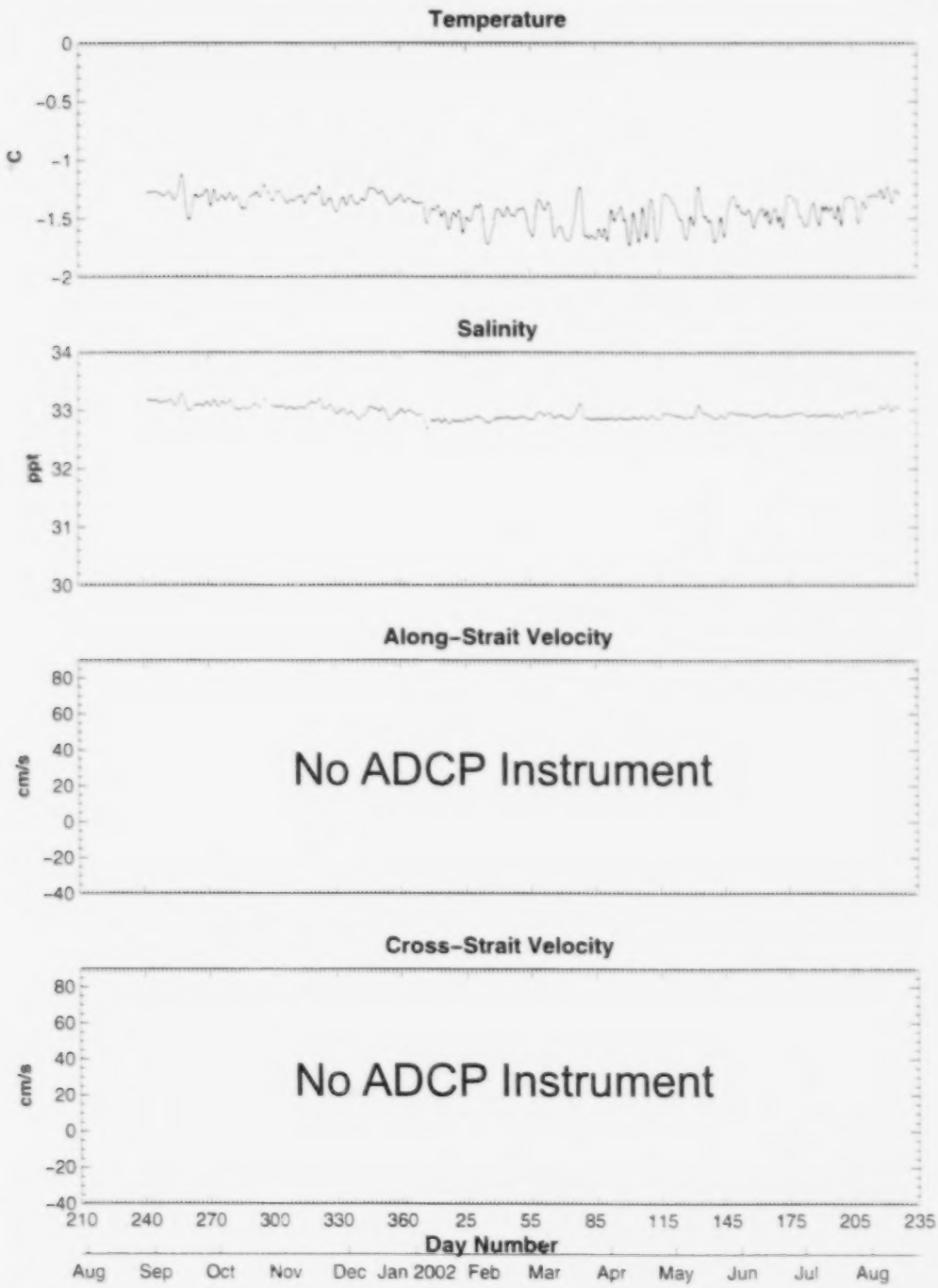


Figure 25 - Low-pass filtered T,S (267 m.)
South-central Barrow Strait: August 2001 - August 2002.

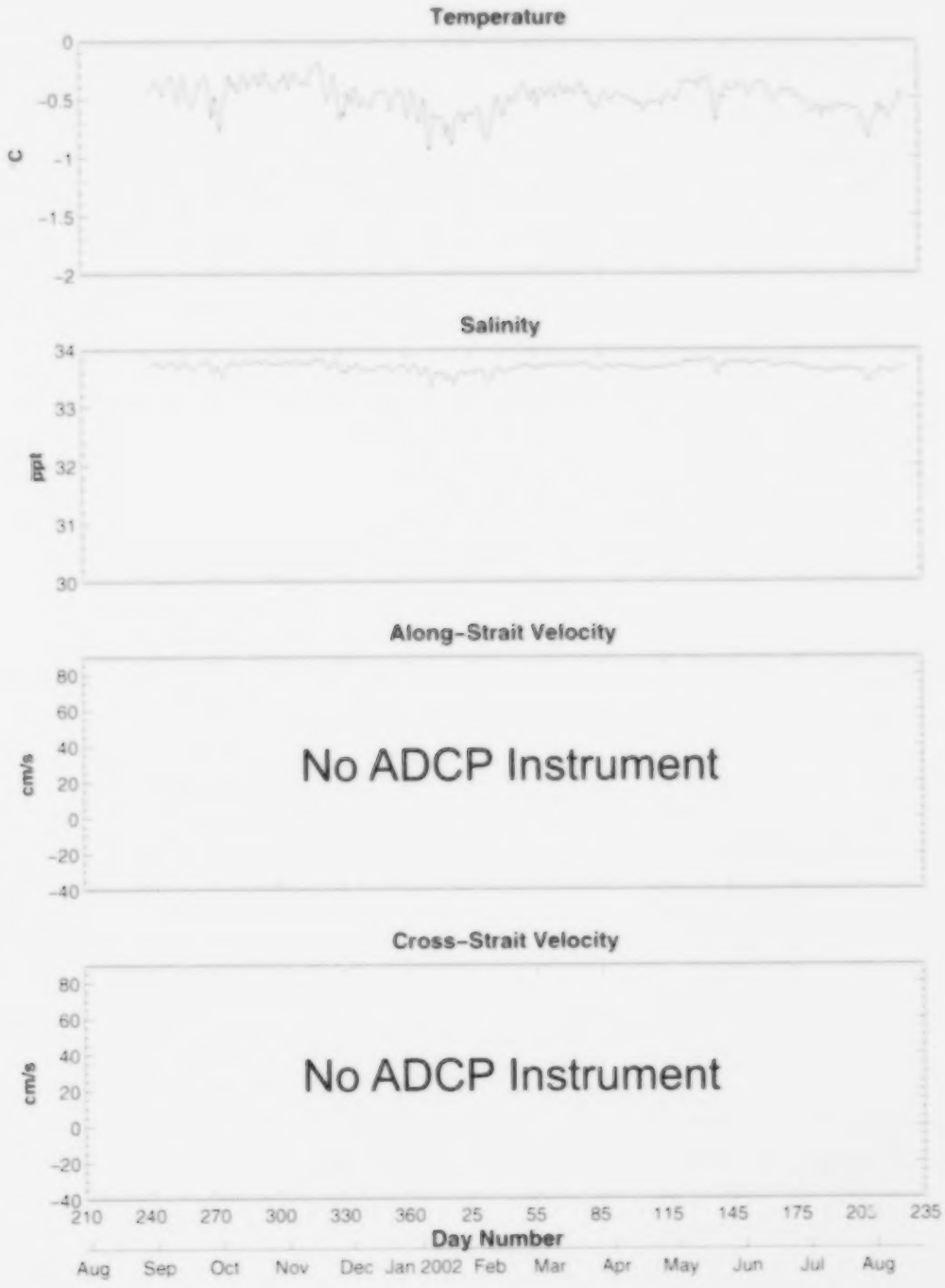


Figure 26 - Low-pass filtered T,S (34 m.) and current data (33 m.).
Central Barrow Strait: August 2001 - August 2002.

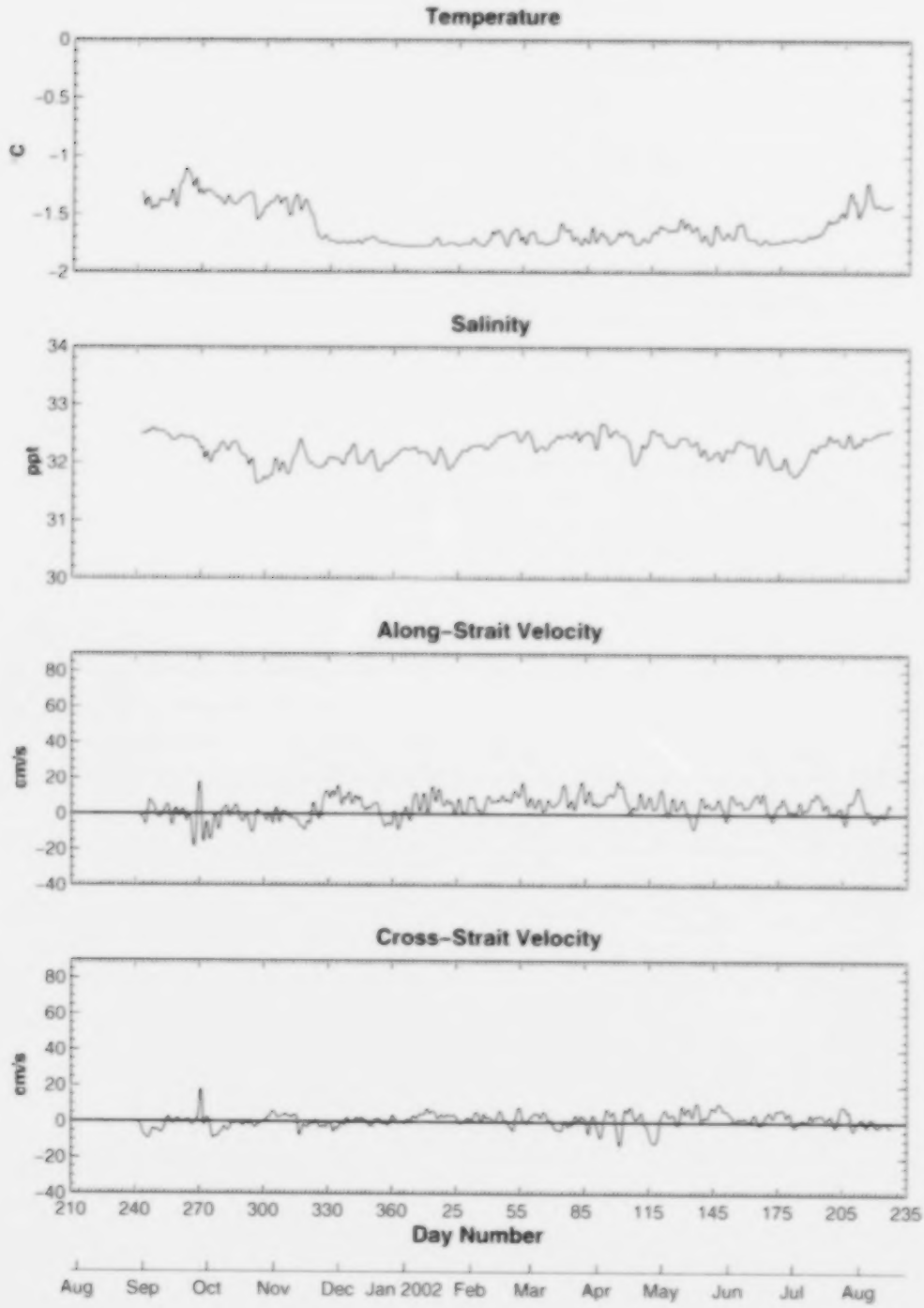


Figure 27 - Low-pass filtered T,S (77 m.) and current data (69 m.).
Central Barrow Strait: August 2001 - August 2002.

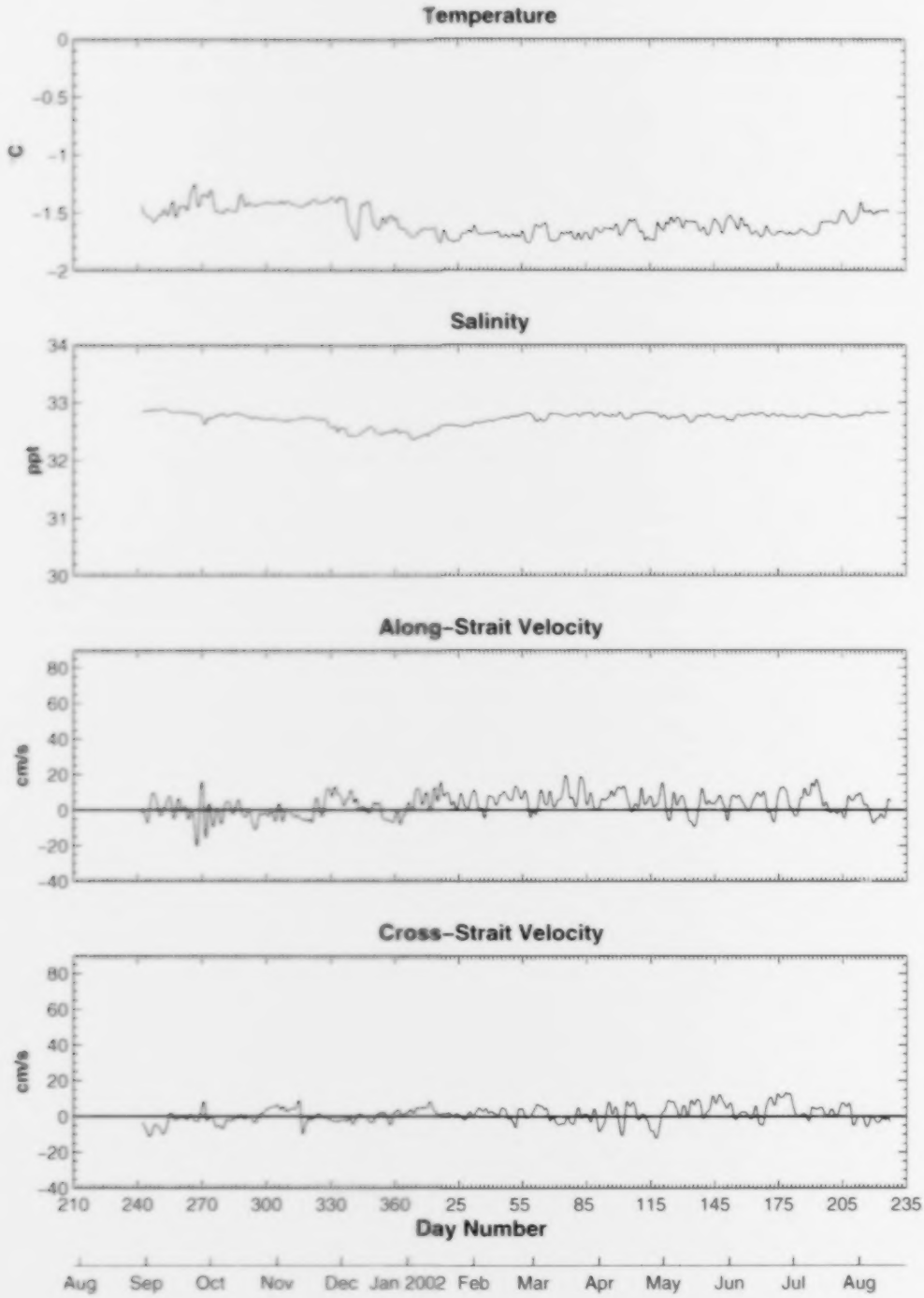


Figure 28 - Low-pass filtered T,S (157 m.)
Central Barrow Strait: August 2001 - August 2002.

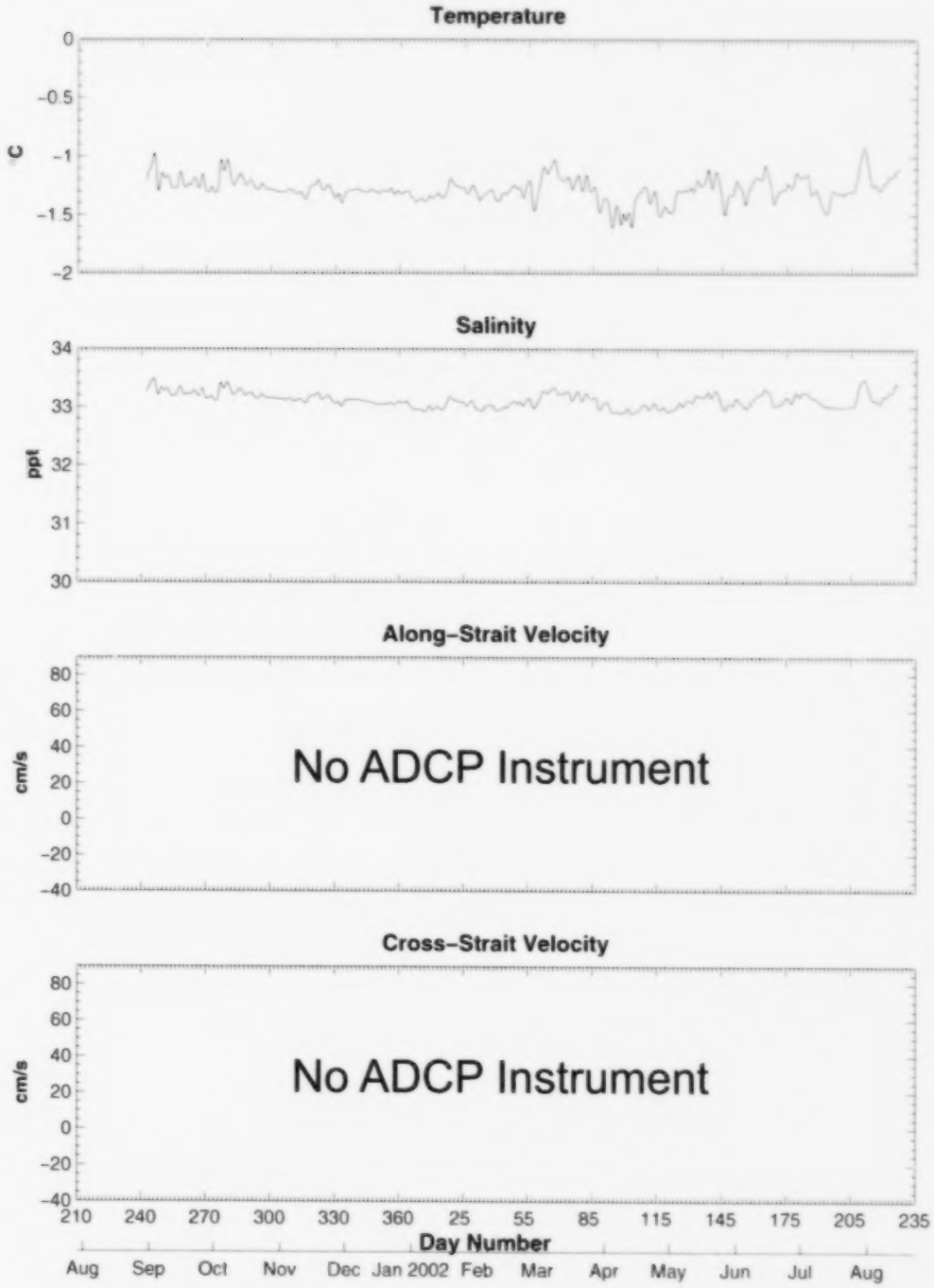


Figure 29 - Low-pass filtered T,S (38 m.) and current data (39 m.).
North side of Barrow Strait: August 2001 - August 2002.

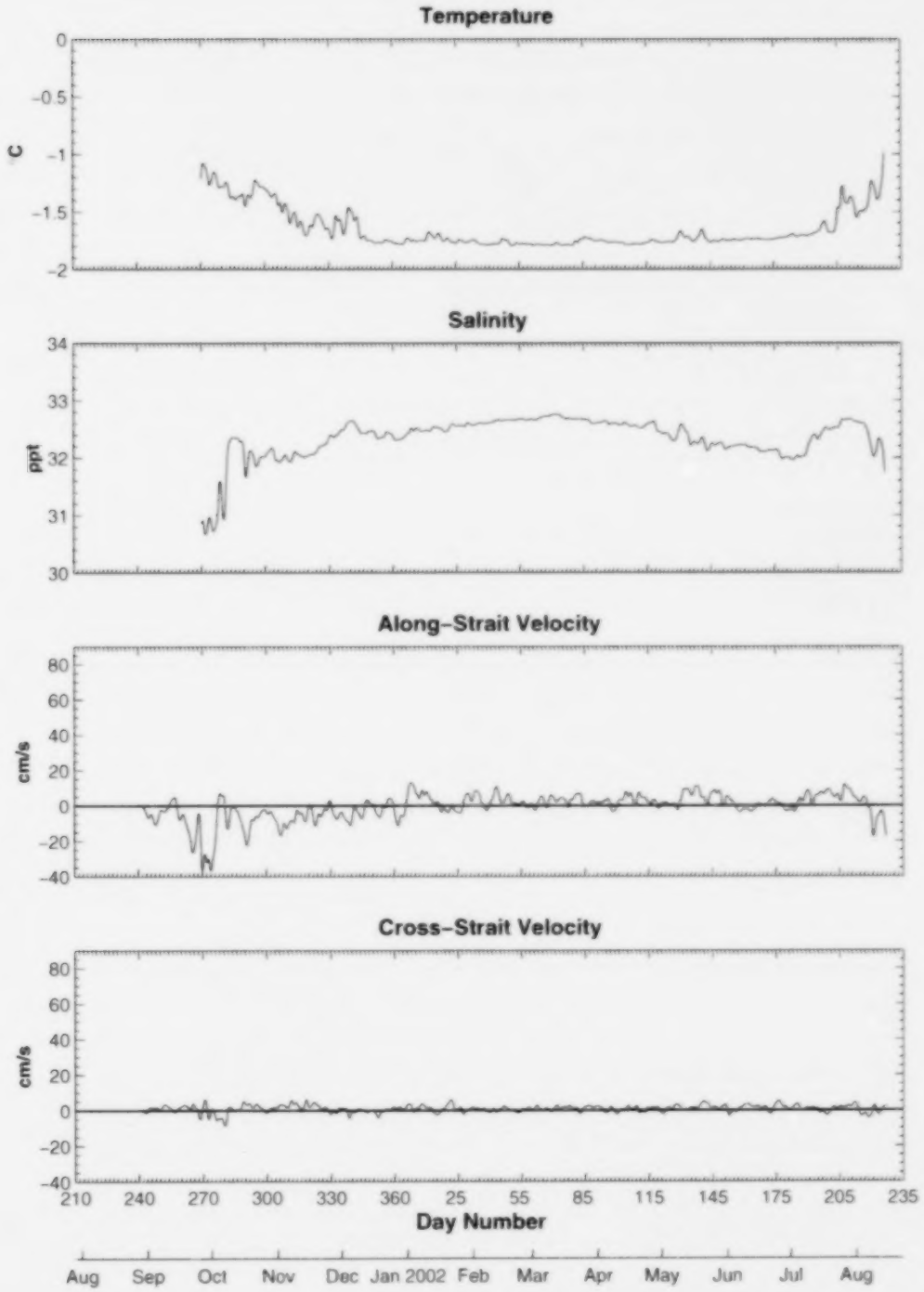


Figure 30 - Low-pass filtered T,S (83 m.) and current data (75 m.). North side of Barrow Strait: August 2001 - August 2002.

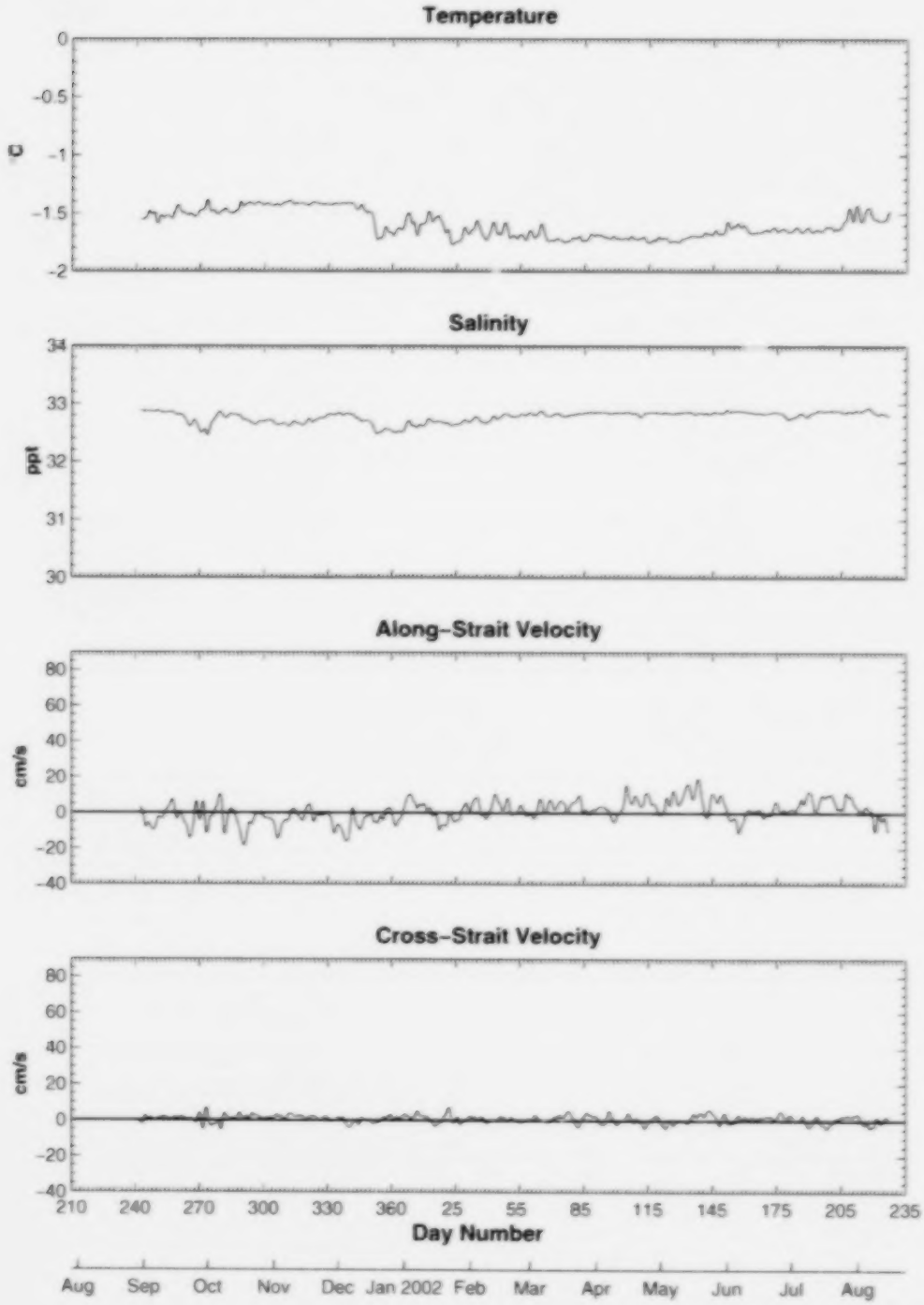


Figure 31 - Low-pass filtered T,S (160 m.)
North side of Barrow Strait: August 2001 - August 2002

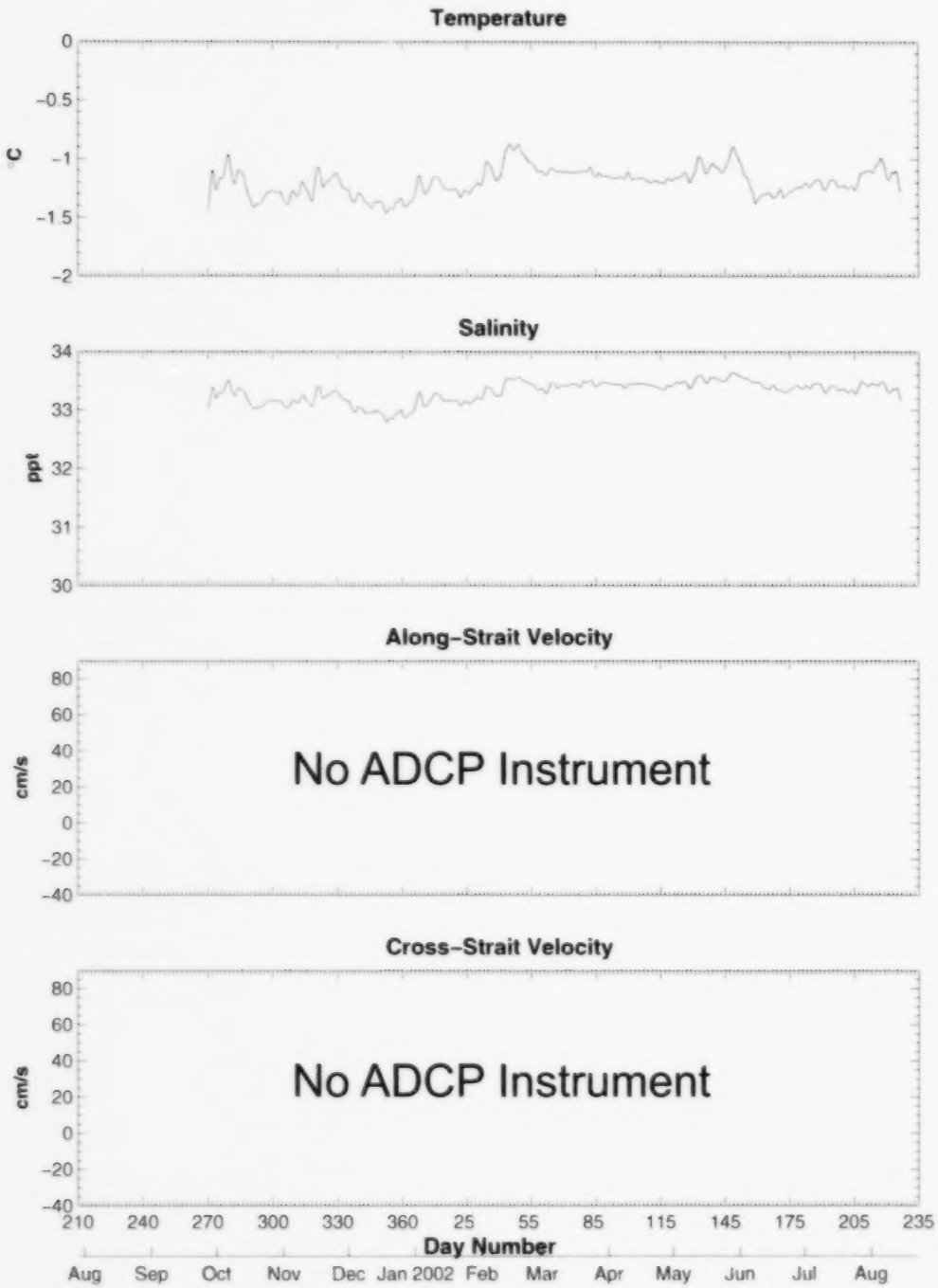


Figure 32: Mean Flows, August 27, 2001 to August 16, 2002

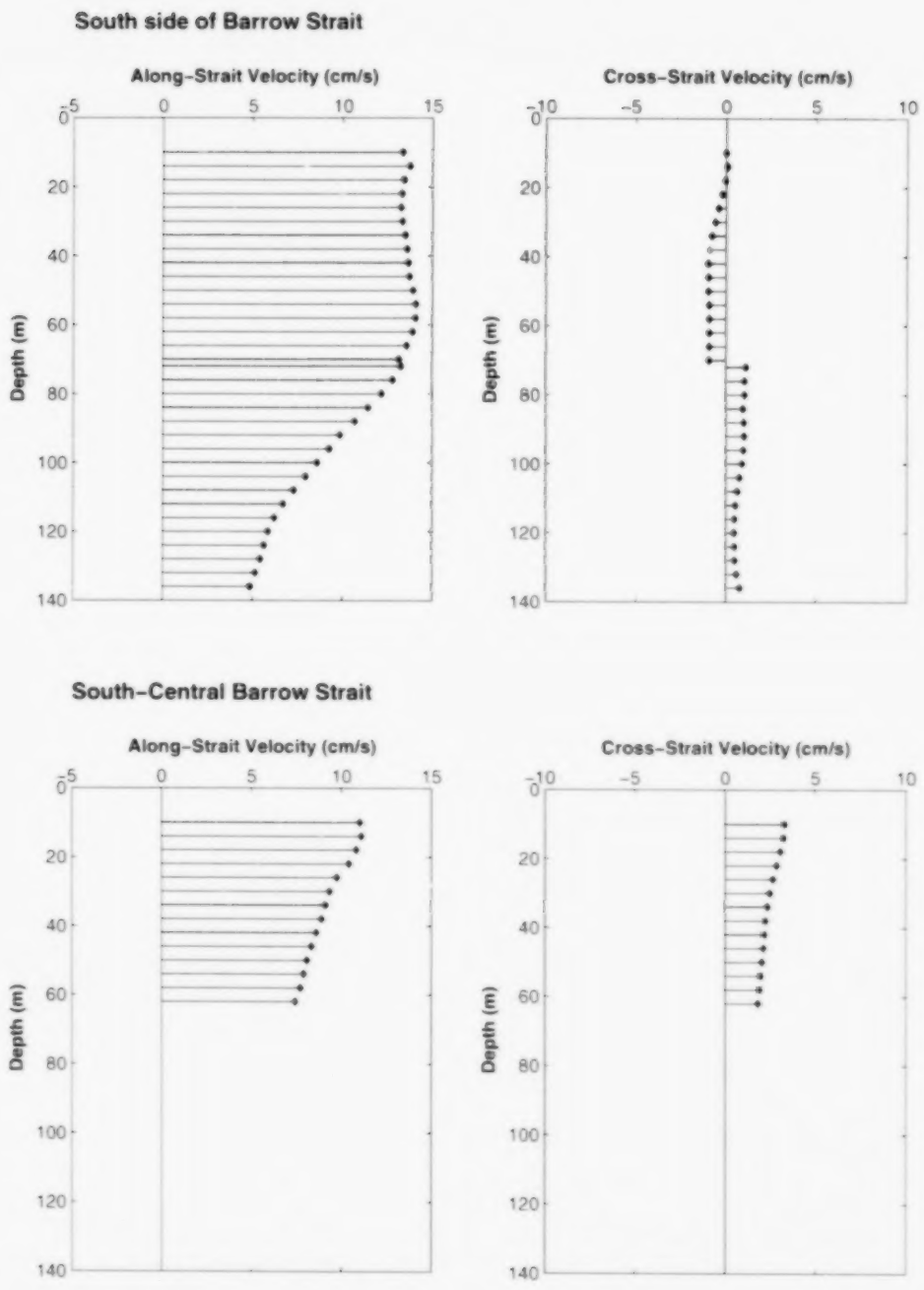
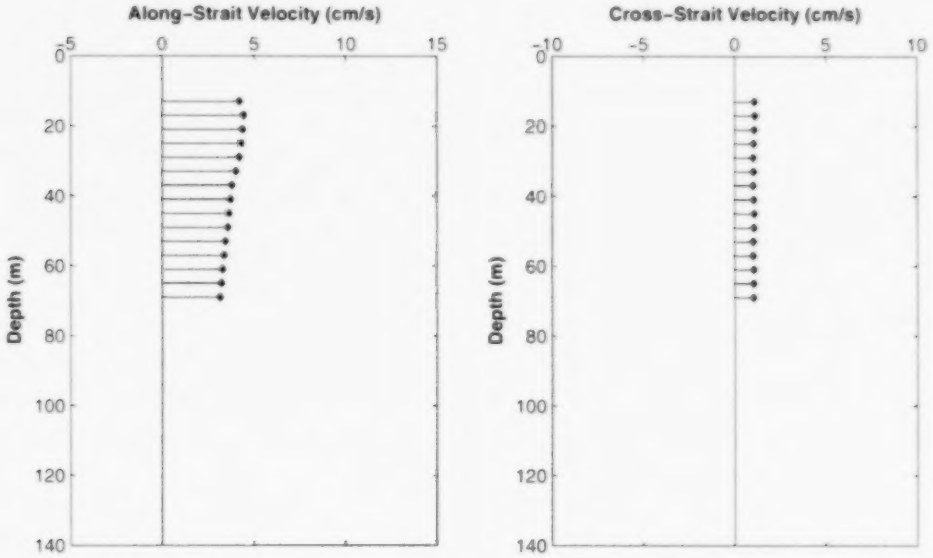


Figure 32: Mean Flows, August 28, 2001 to August 16, 2002 (continued)

Central Barrow Strait



North side of Barrow Strait

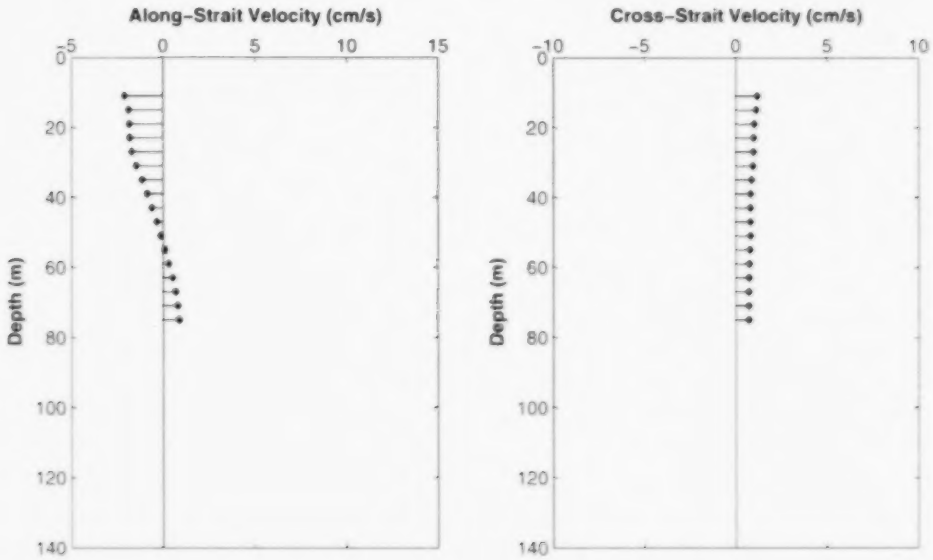


Figure 33: Mean Flows, Late Summer Aug. 2001 to Sep. 2001

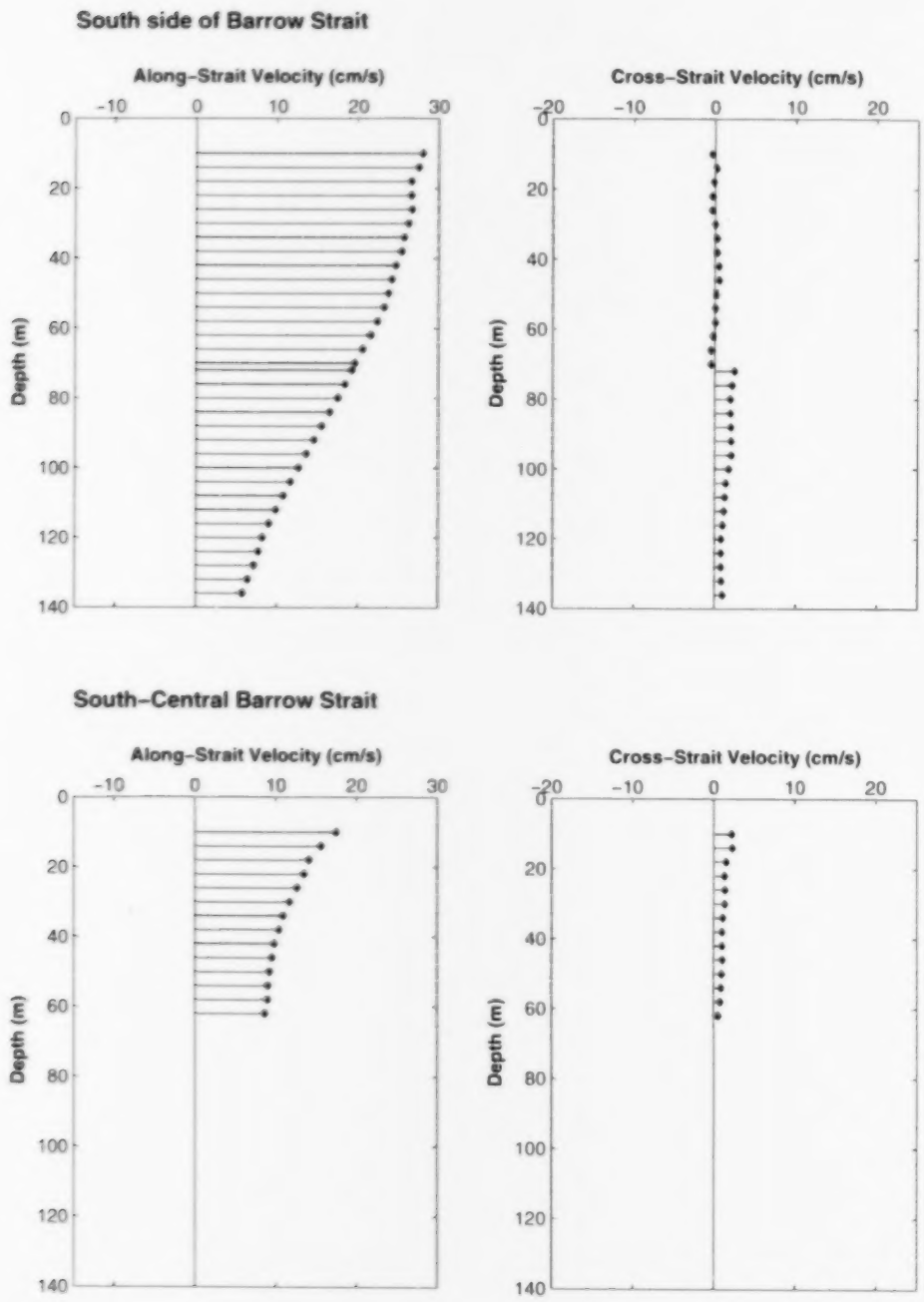
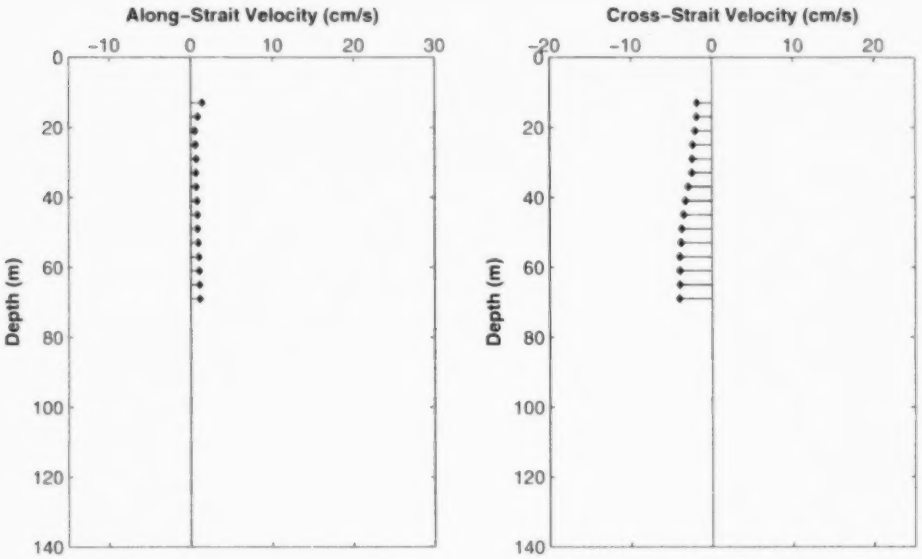


Figure 33: Mean Flows, Late Summer: Aug. 2001 to Sep. 2001 (continued)

Central Barrow Strait



North side of Barrow Strait

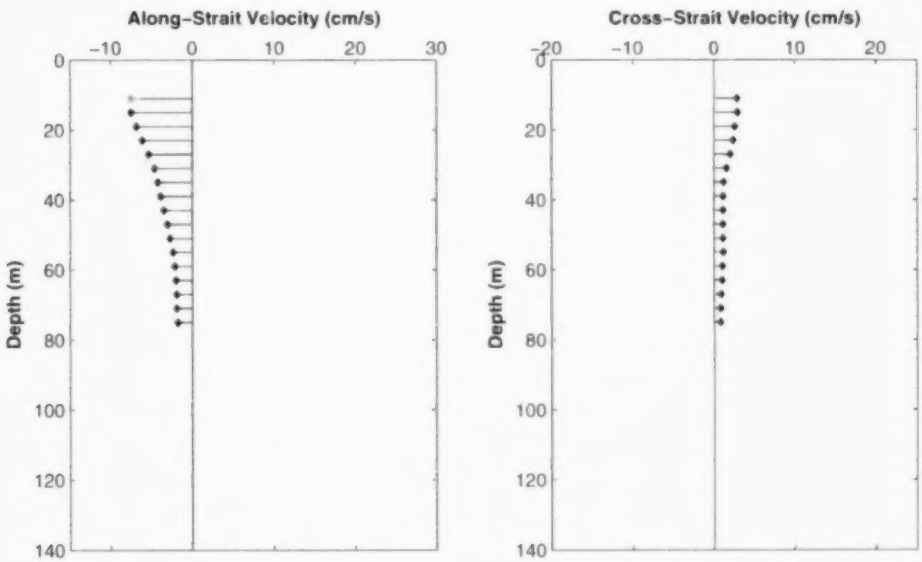


Figure 34: Mean Flows, Fall: Sep. 2001 to Dec. 2001

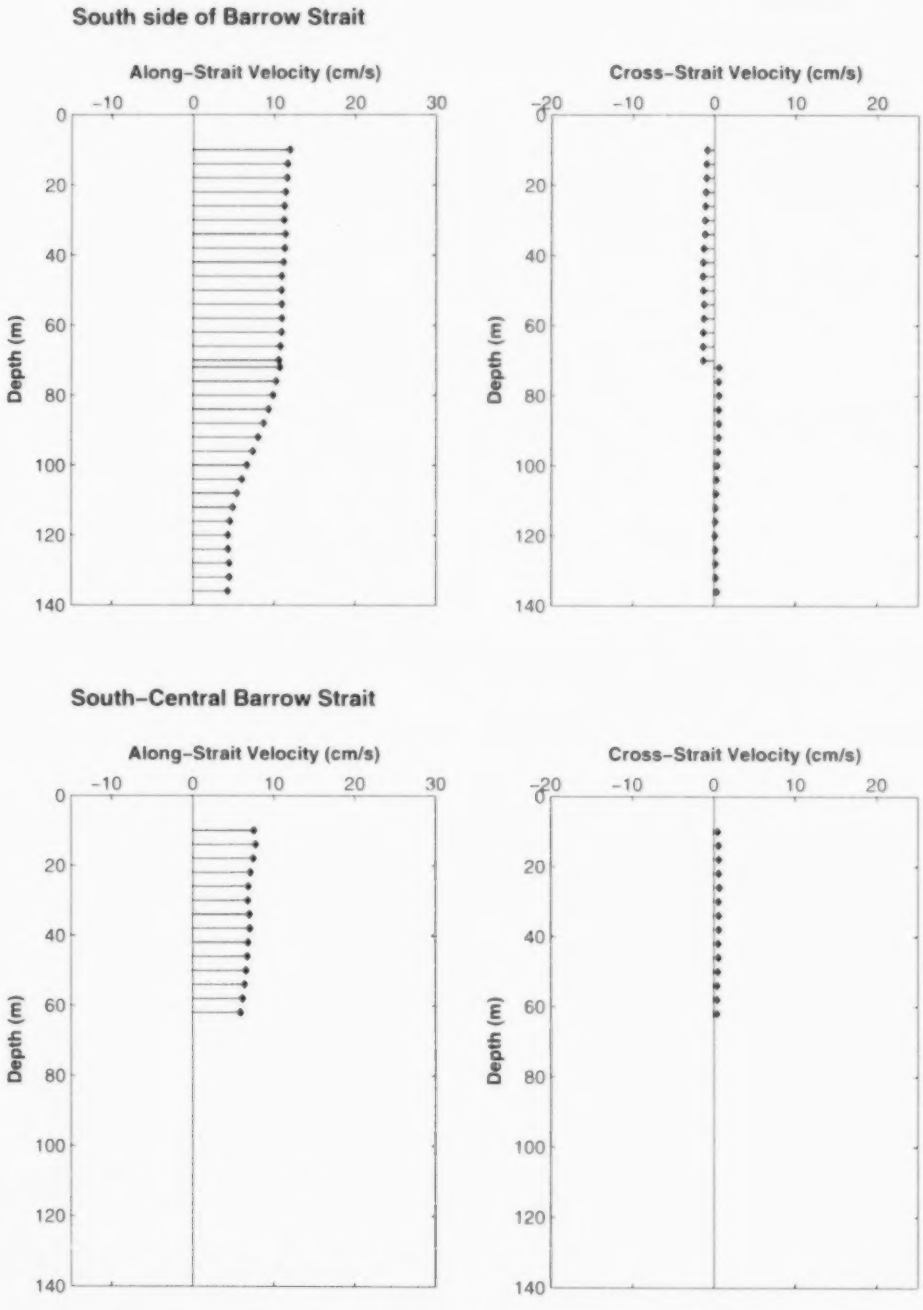
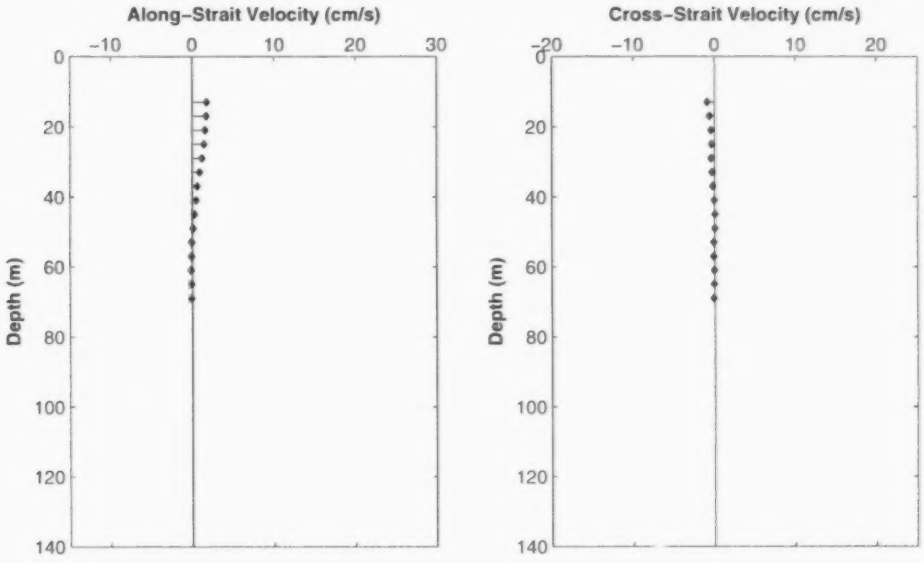


Figure 34: Mean Flows, Fall: Sep. 2001 to Dec. 2001 (continued)

Central Barrow Strait



North side of Barrow Strait

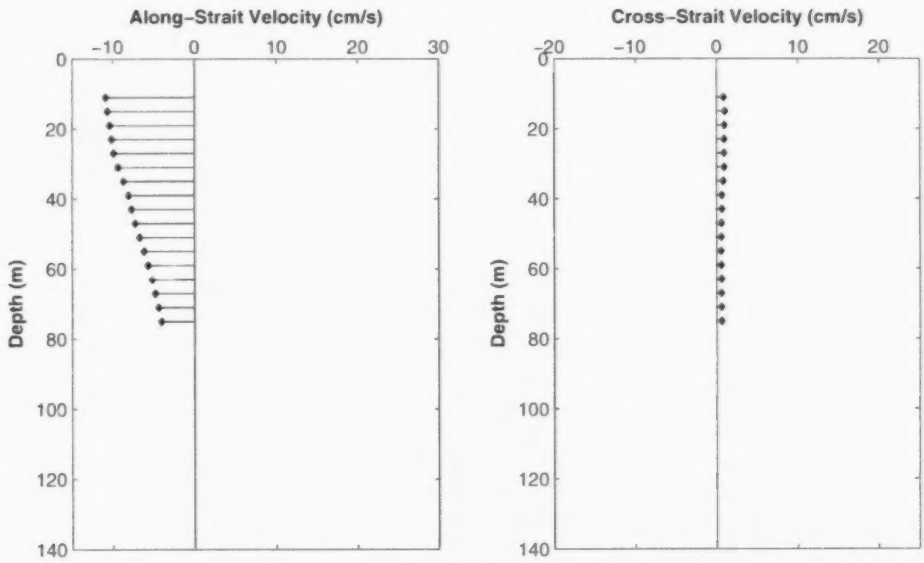
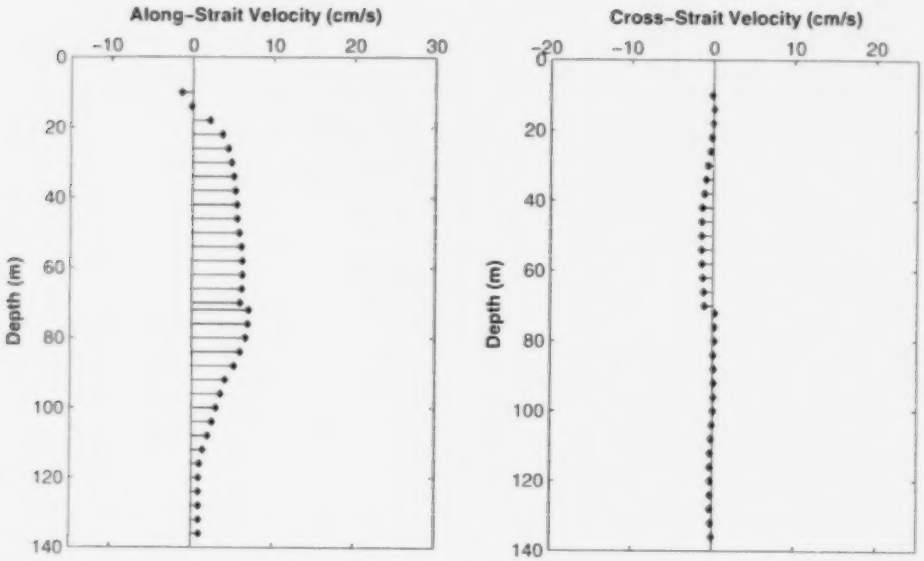


Figure 35: Mean Flows, Winter: Dec. 2001 to Mar. 2002

South side of Barrow Strait



South-Central Barrow Strait

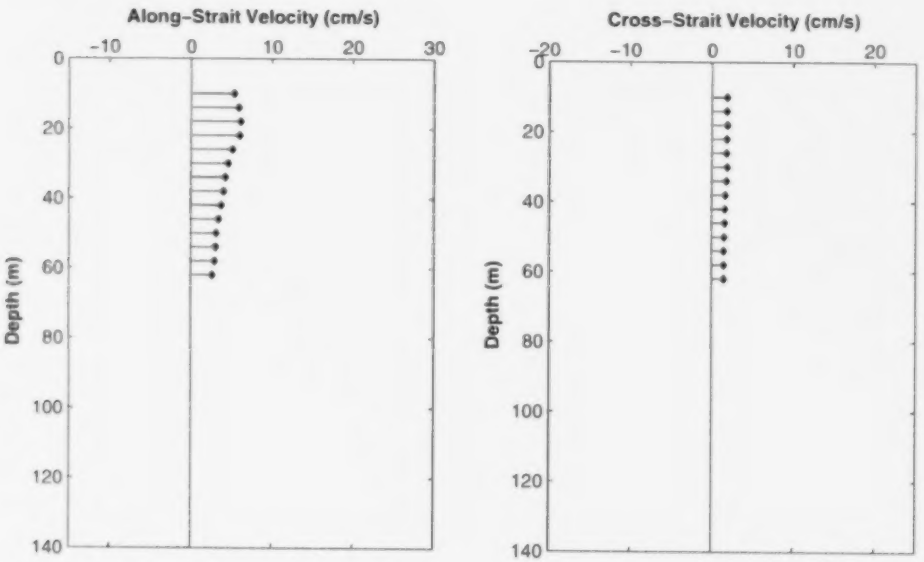
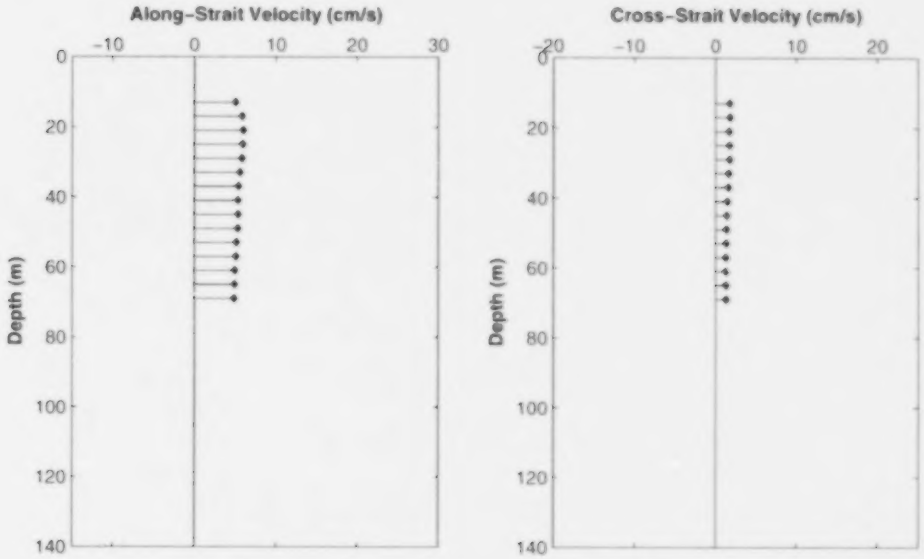


Figure 35: Mean Flows, Winter: Dec. 2001 to Mar. 2002 (continued)

Central Barrow Strait



North side of Barrow Strait

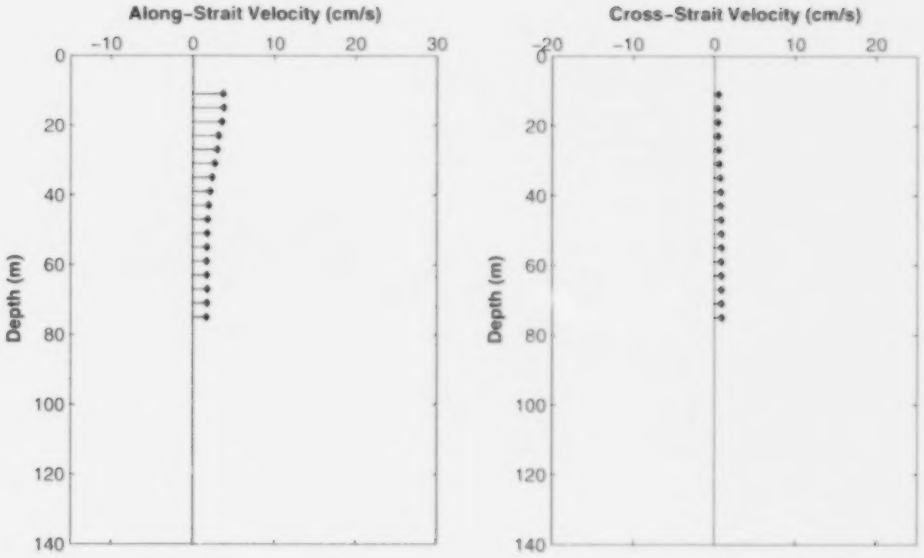


Figure 36: Mean Flows, Spring: Mar. 2002 to Jun. 2002

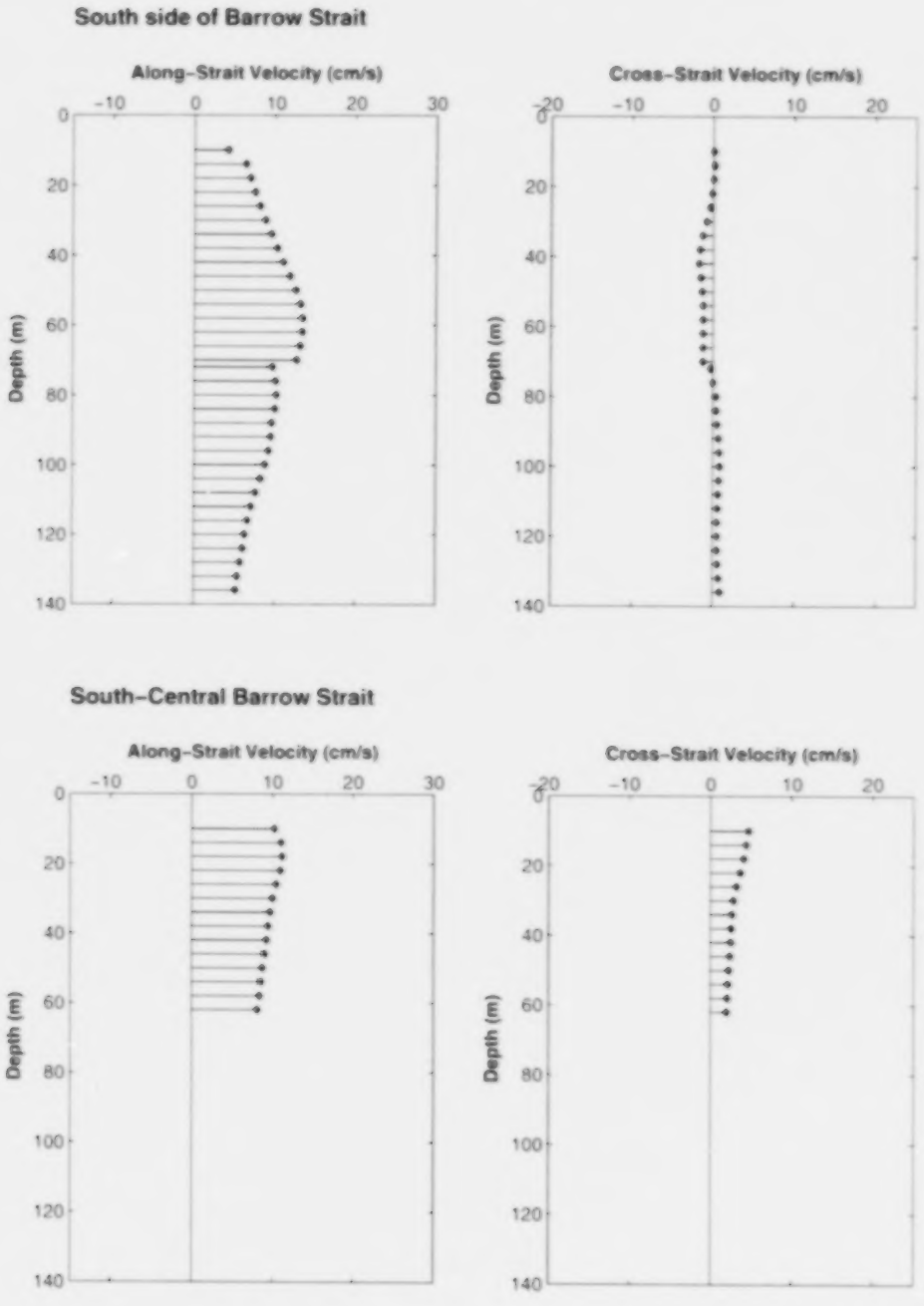
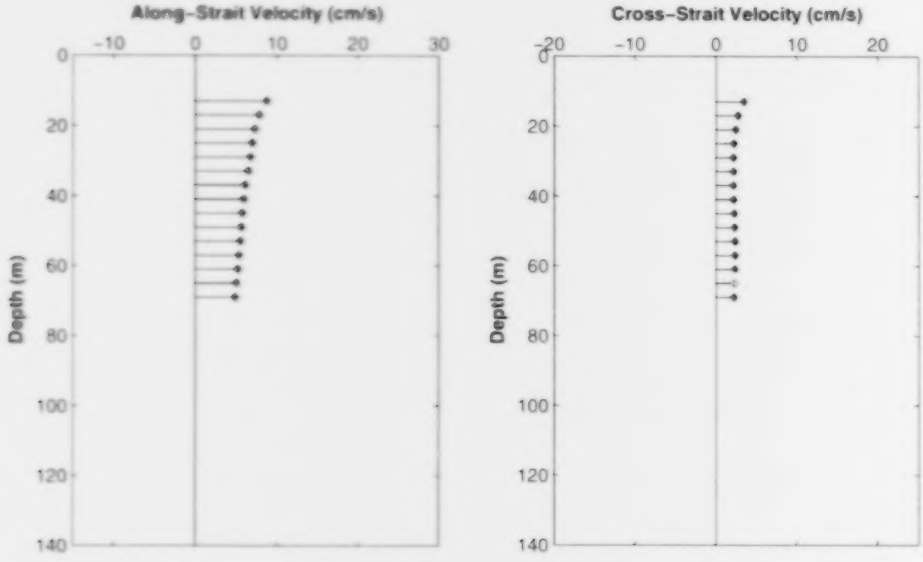


Figure 36: Mean Flows, Spring: Mar. 2002 to Jun. 2002 (continued)

Central Barrow Strait



North side of Barrow Strait

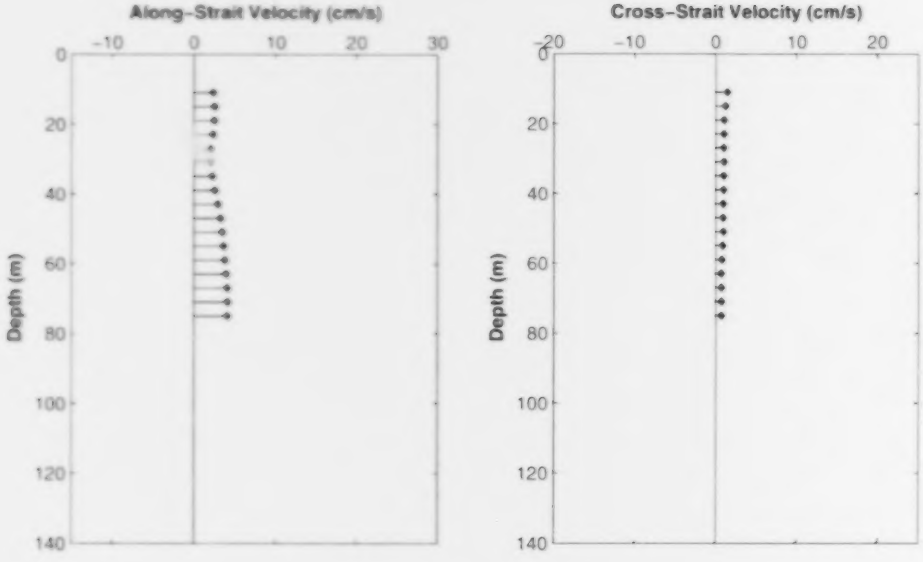


Figure 37: Mean Flows, Early Summer: Jun. 2002 to Aug. 2002

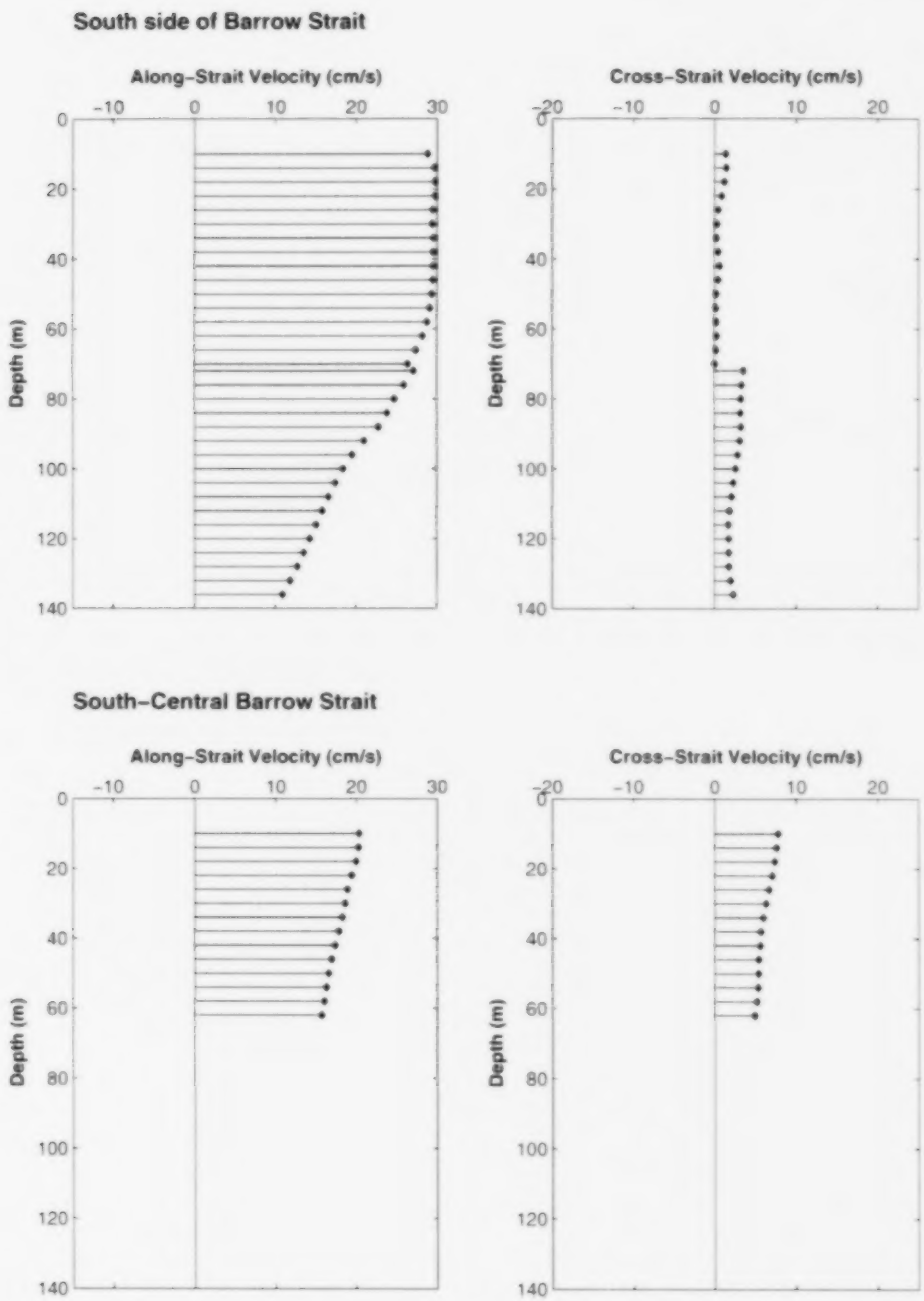
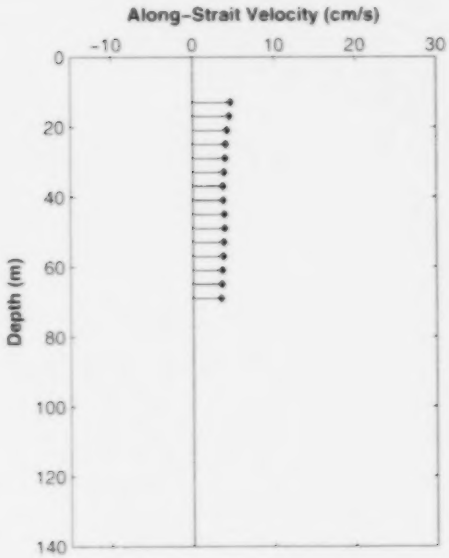
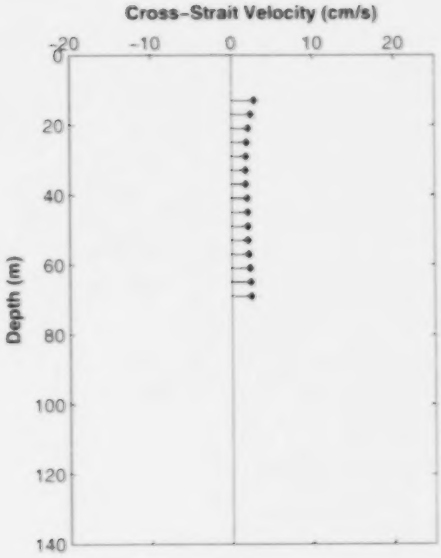


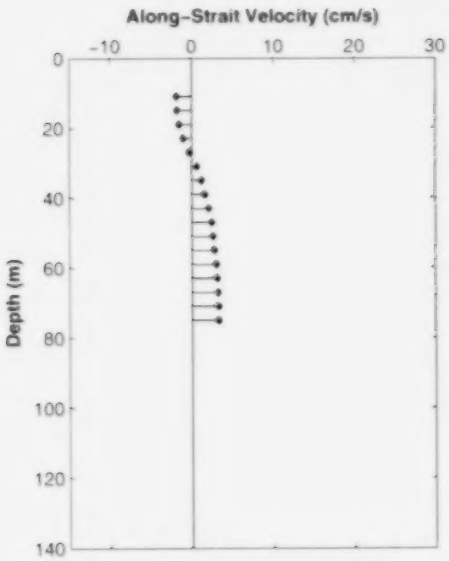
Figure 37: Mean Flows, Early Summer: Jun. 2002 to Aug. 2002 (continued)

Central Barrow Strait





North side of Barrow Strait



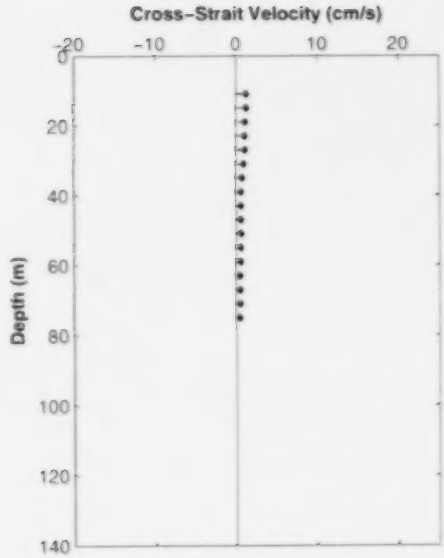


Figure 38: Variance in bihourly and low-pass filtered currents
August 2001 to August 2002

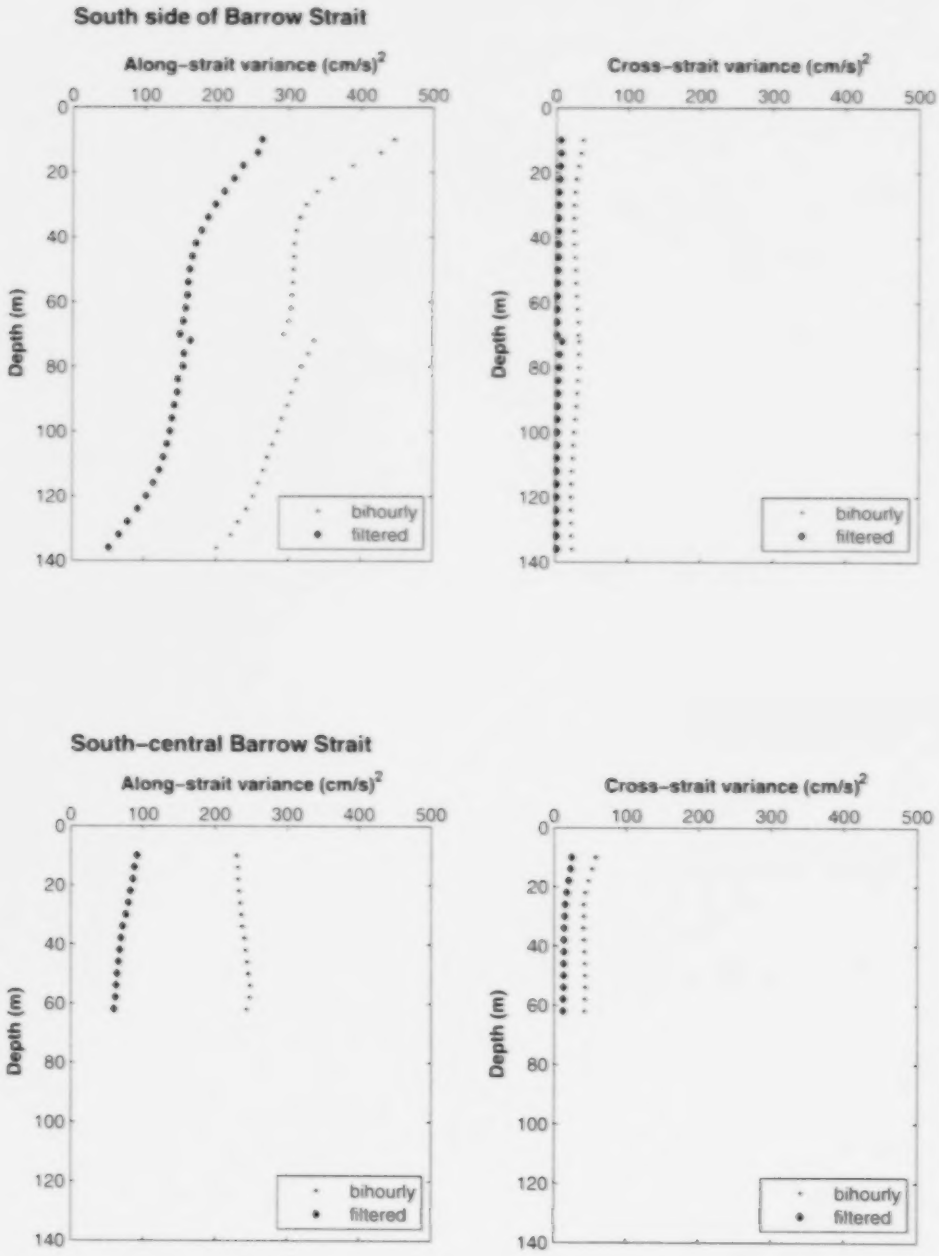
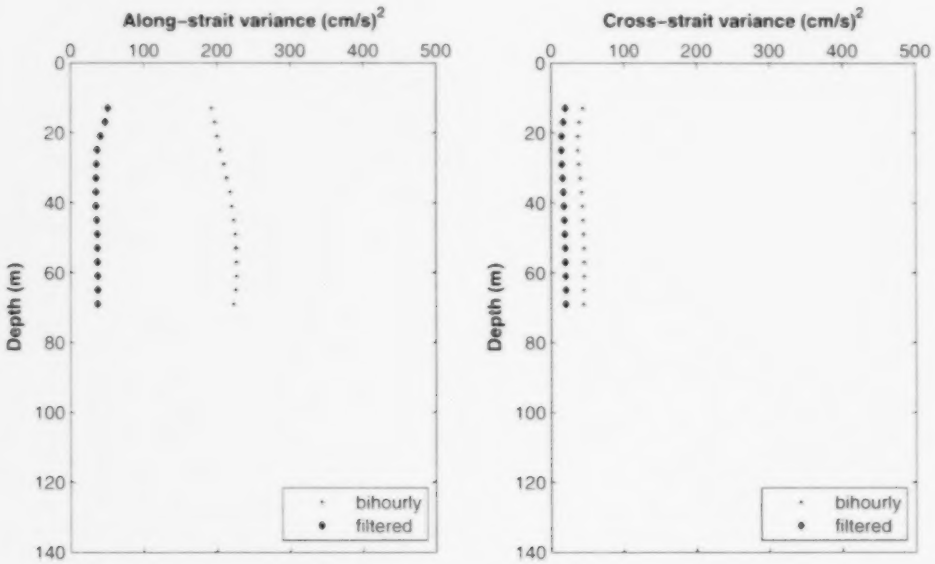


Figure 38: Variance in bihourly and low-pass filtered currents (continued)
August 2001 to August 2002

Central Barrow Strait



North side of Barrow Strait

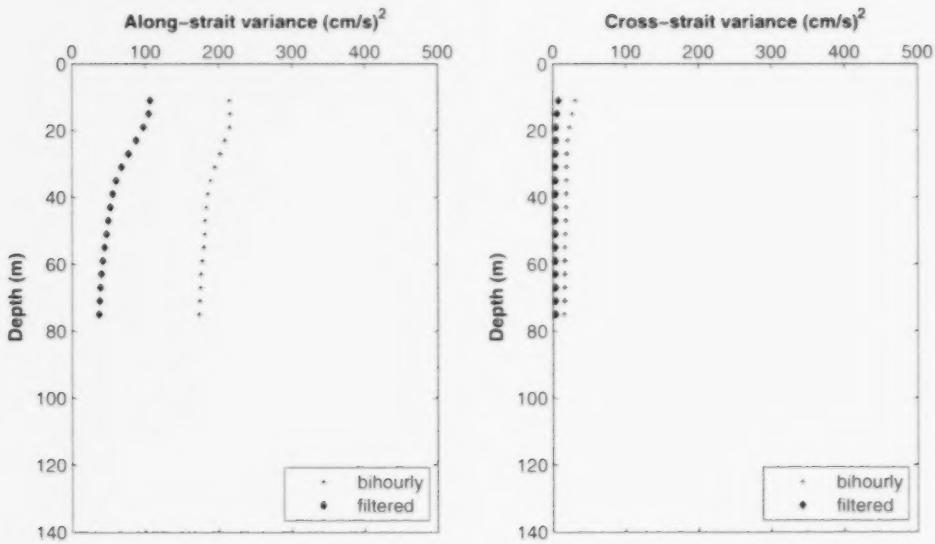
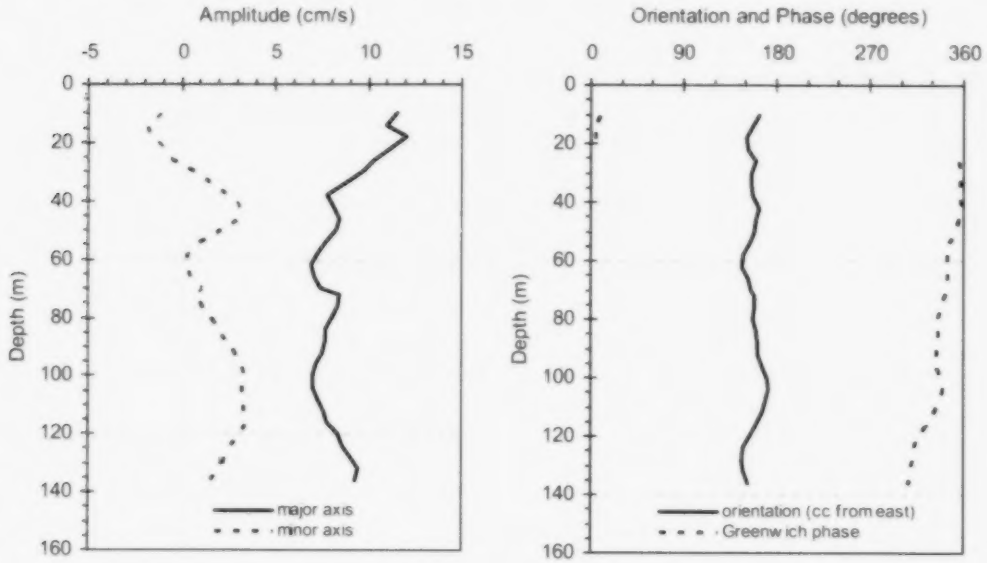


Figure 39 – K1 Tidal Constituent, South Side of Barrow Strait

For ice-free period (Aug 27, 2001 to Oct 10, 2001):



For solid-ice period (Feb 1, 2002 to Jul 6, 2002):

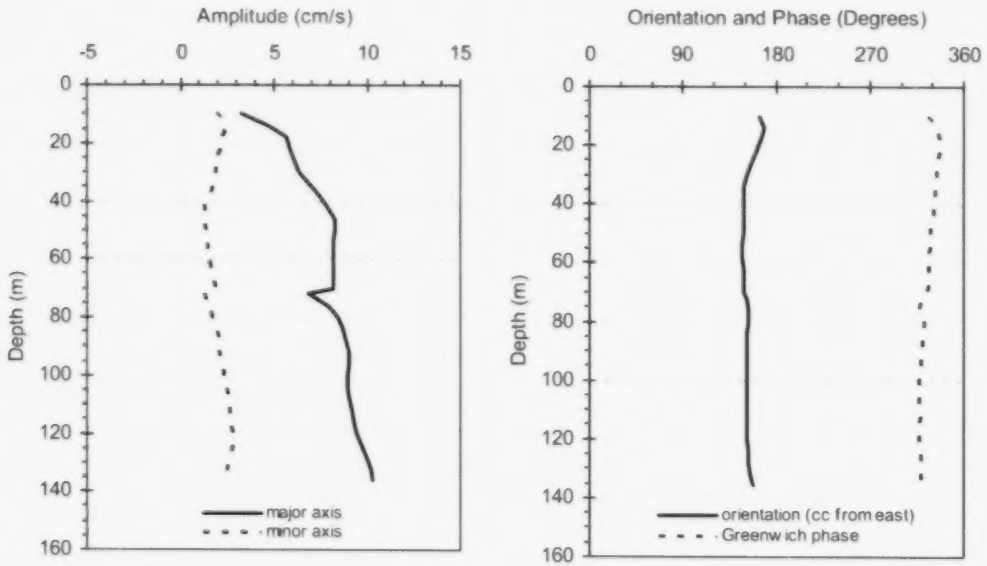
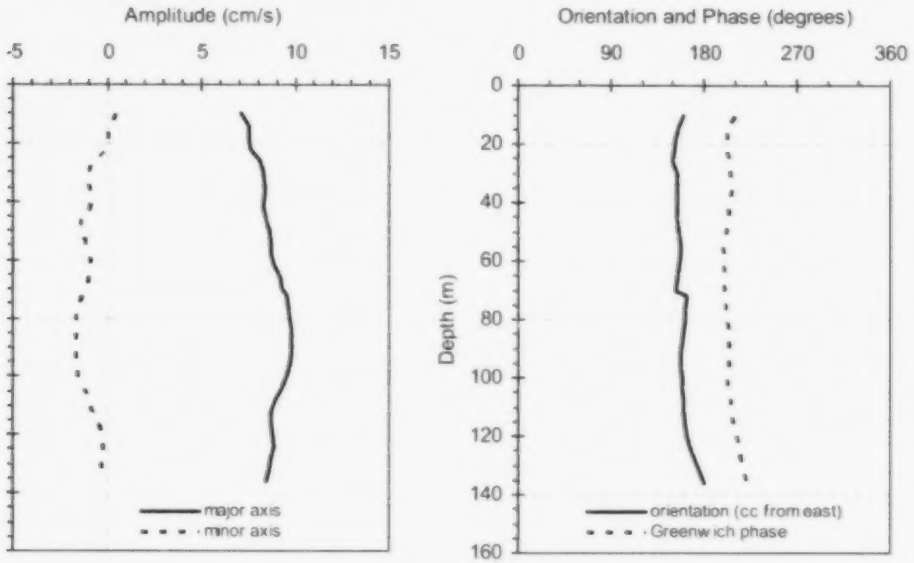


Figure 40 – M2 Tidal Constituent, South Side of Barrow Strait

For ice-free period (Aug 27, 2001 to Oct 10, 2001):



For solid-ice period (Feb 1, 2002 to Jul 6, 2002):

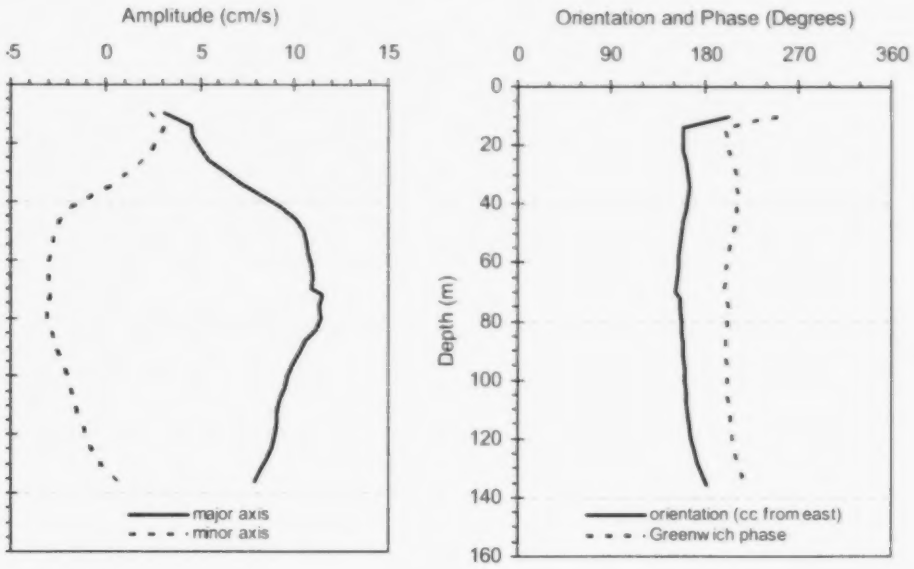
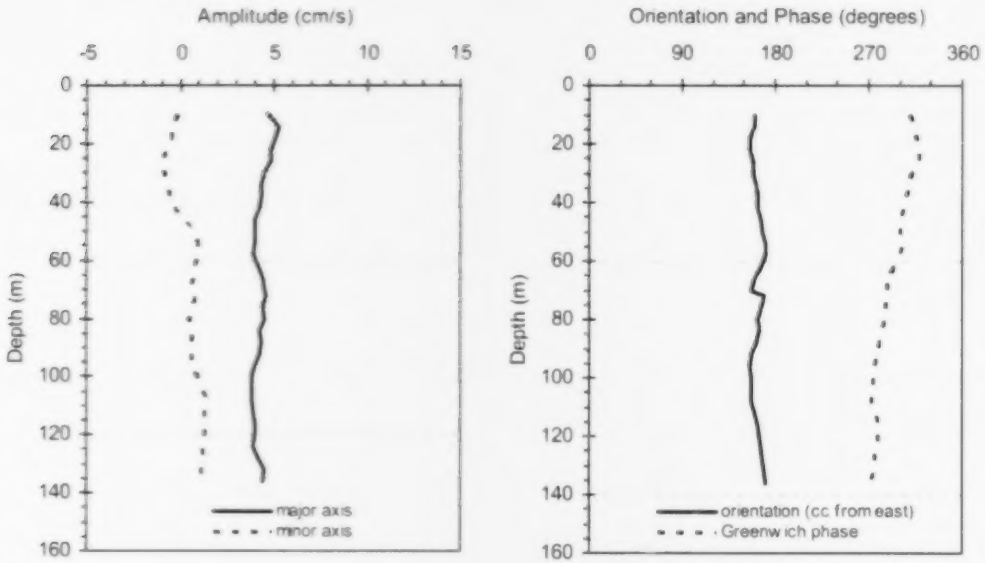


Figure 41 – O1 Tidal Constituent, South Side of Barrow Strait

For ice-free period (Aug 27, 2001 to Oct 10, 2001):



For solid-ice period (Feb 1, 2002 to Jul 6, 2002):

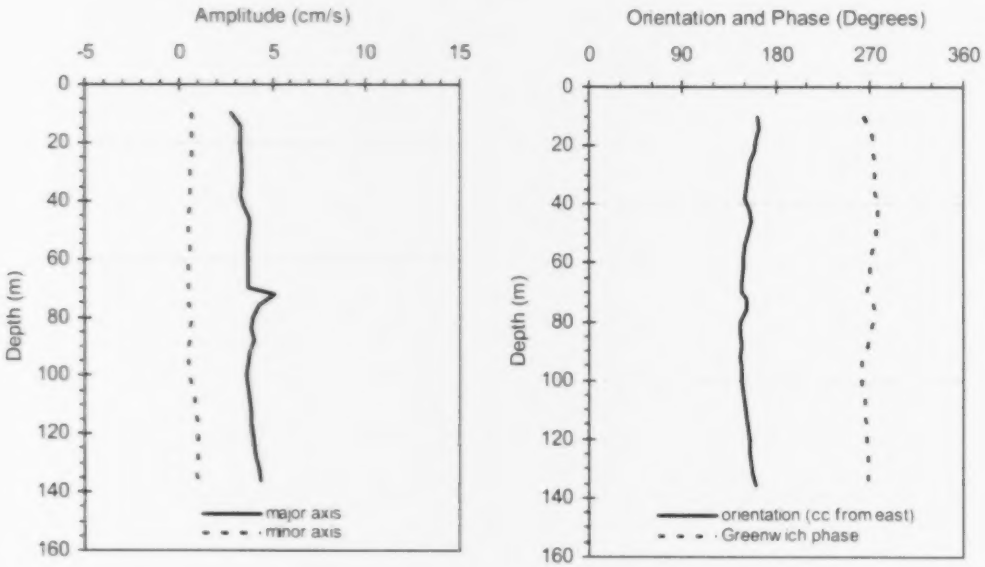
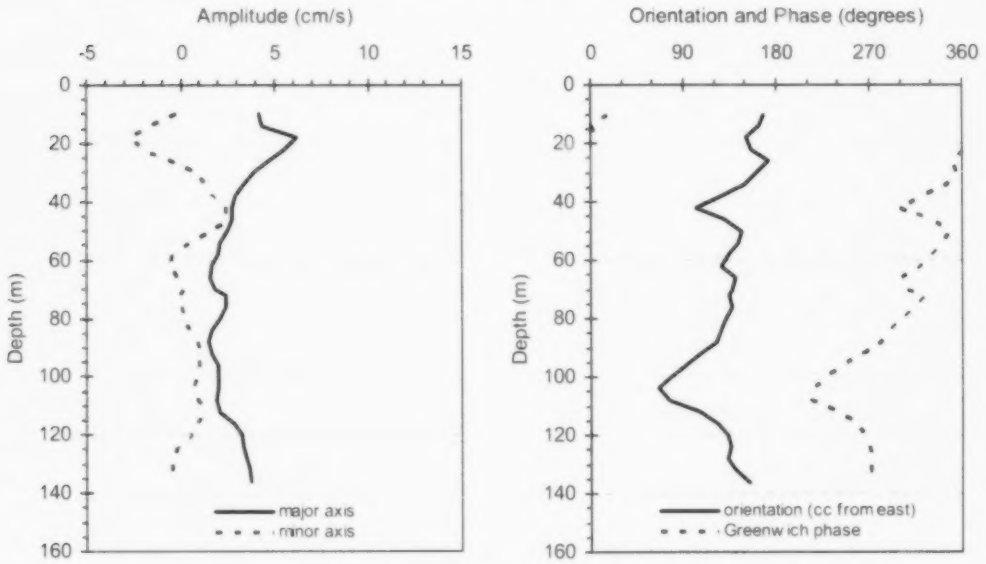


Figure 42 – P1 Tidal Constituent, South Side of Barrow Strait

For ice-free period (Aug 27, 2001 to Oct 10, 2001):



For solid-ice period (Feb 1, 2002 to Jul 6, 2002):

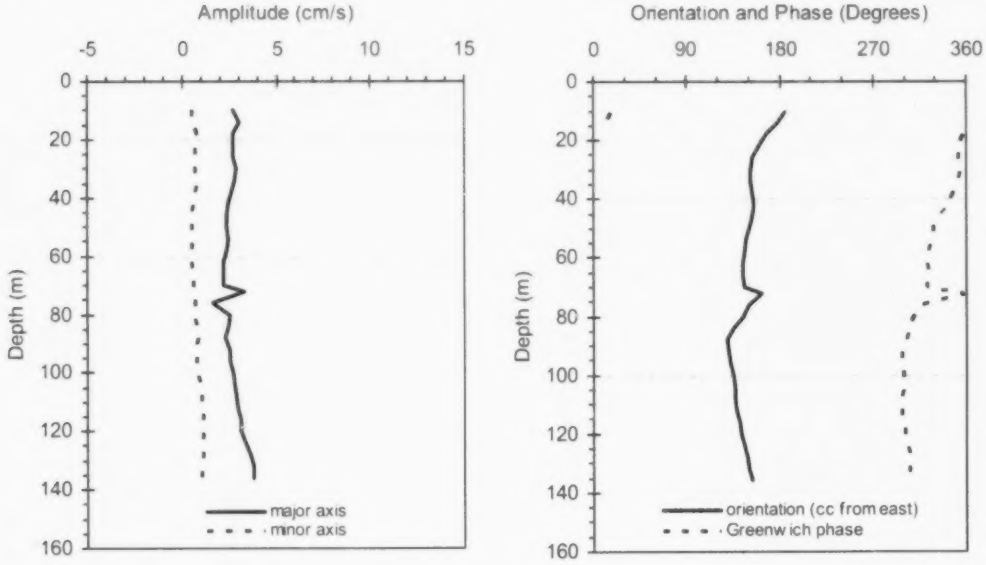
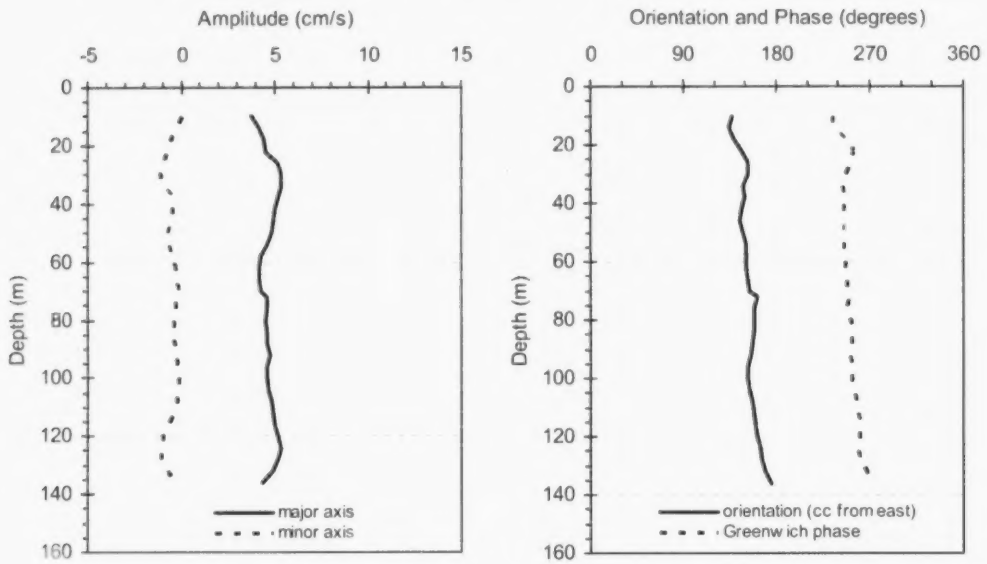


Figure 43 – S2 Tidal Constituent, South Side of Barrow Strait

For ice-free period (Aug 27, 2001 to Oct 10, 2001):



For solid-ice period (Feb 1, 2002 to Jul 6, 2002):

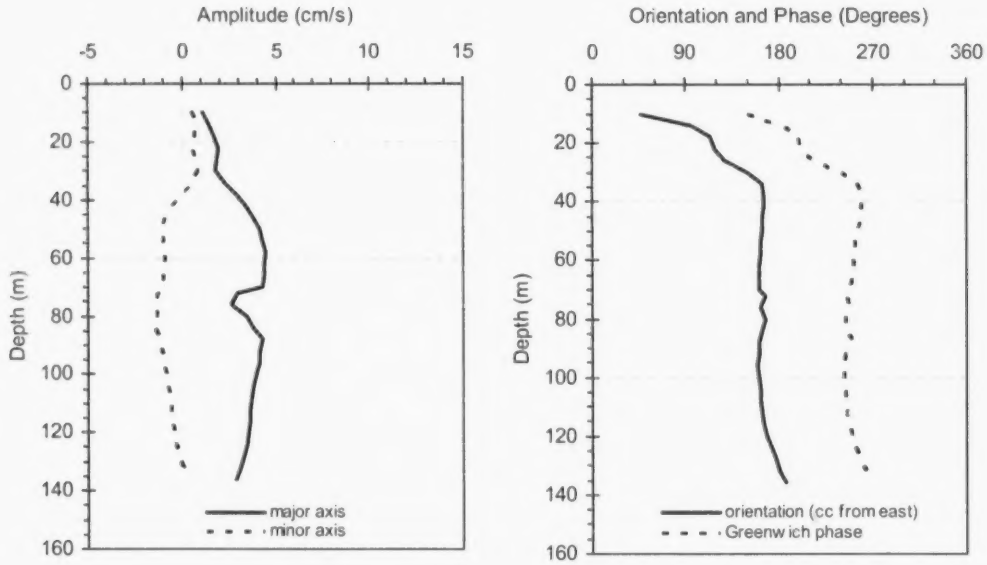
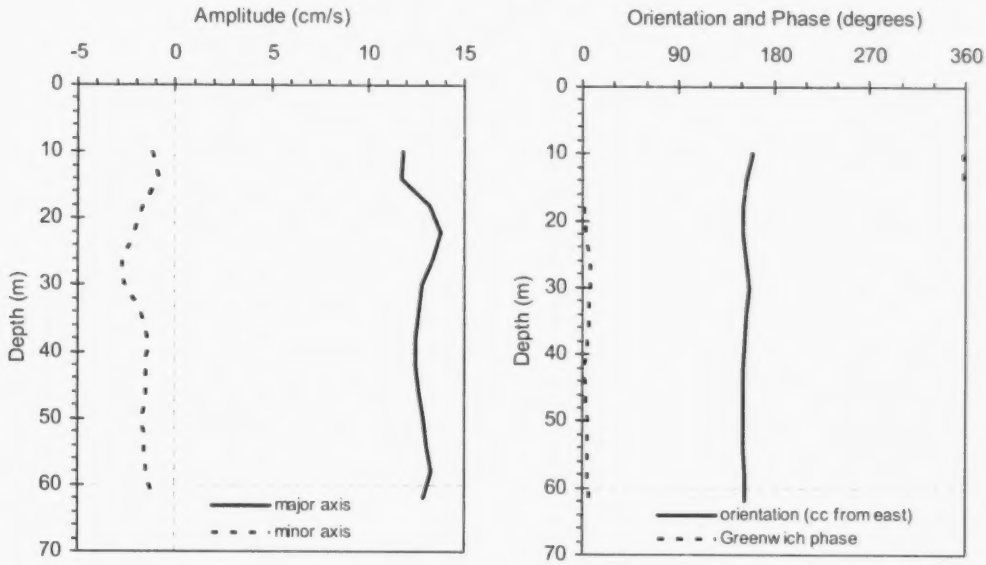


Figure 44 - K1 Tidal Constituent, South-central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

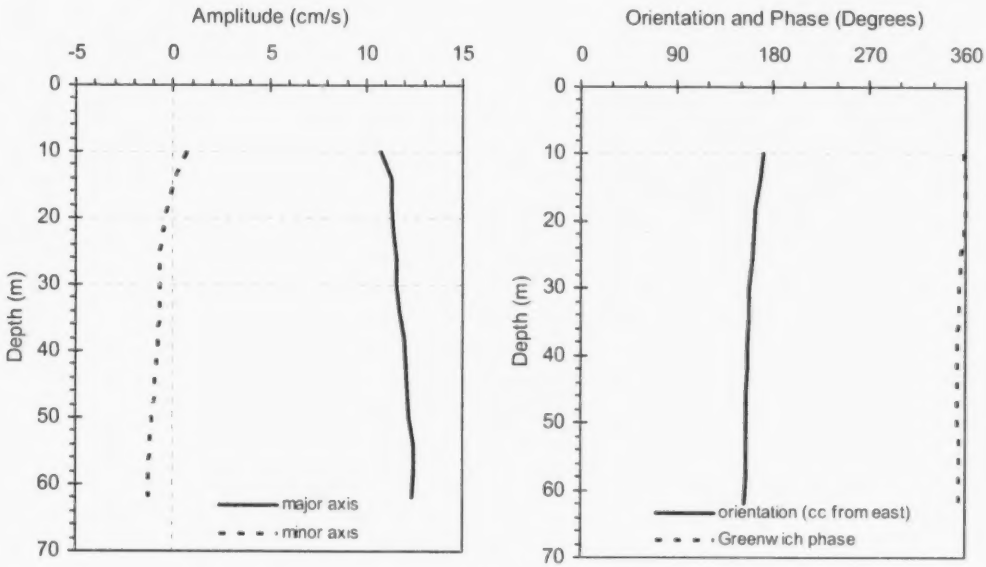
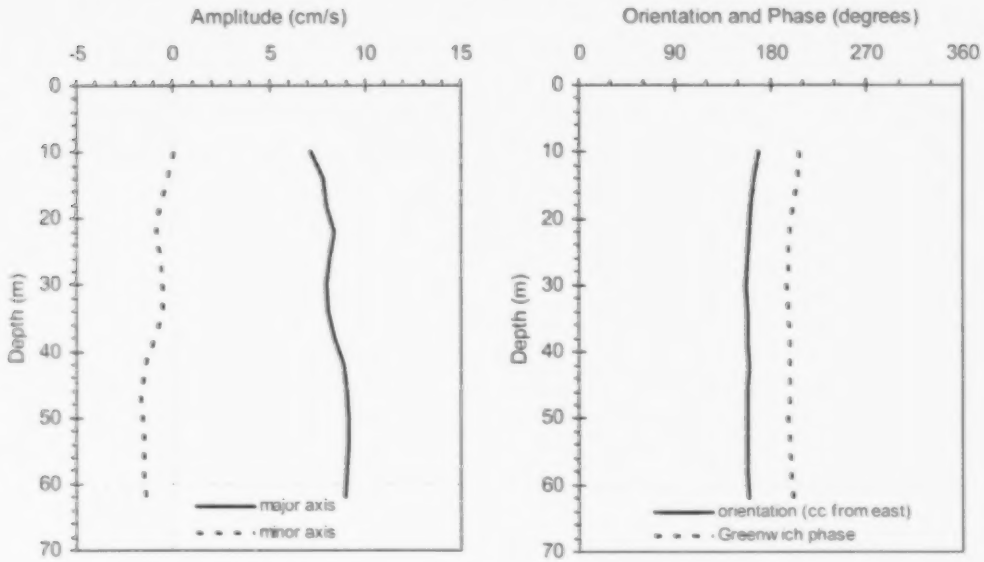


Figure 45 – M2 Tidal Constituent, South-central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

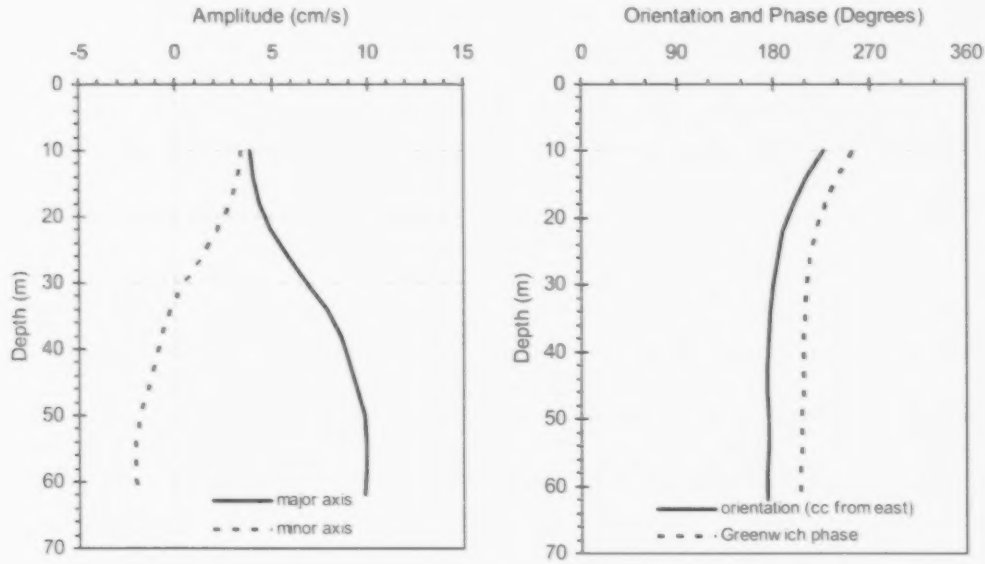
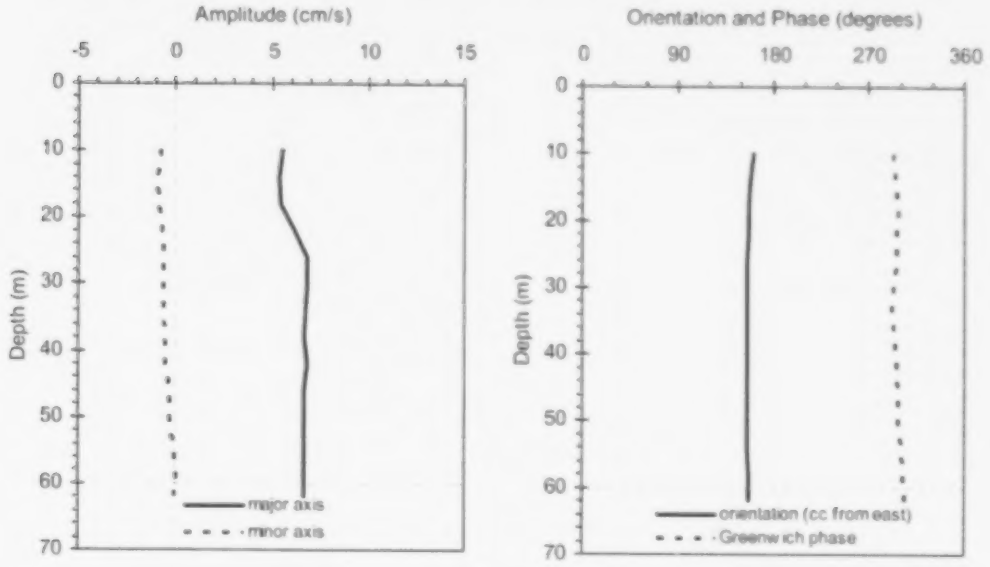


Figure 46 – O1 Tidal Constituent, South-central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

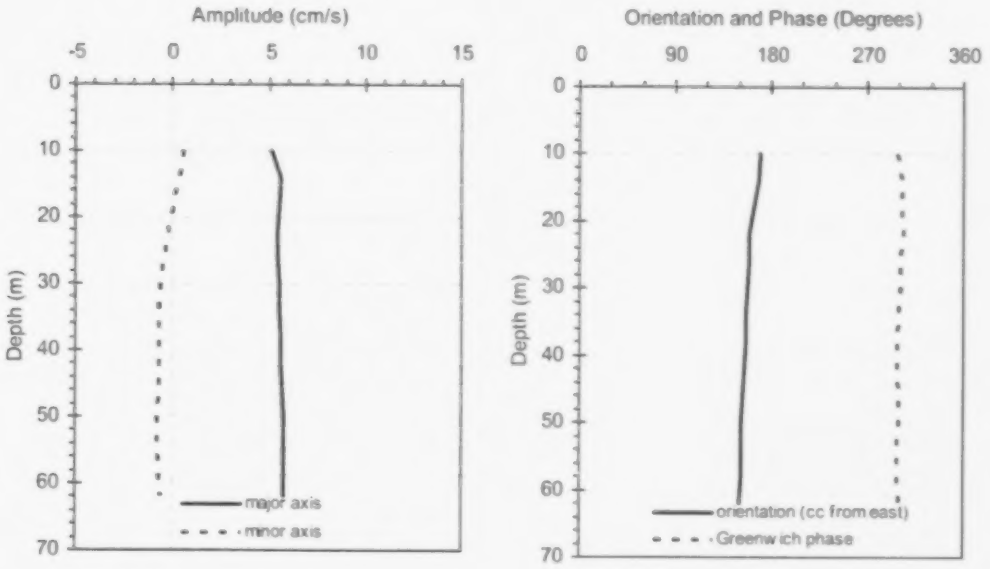
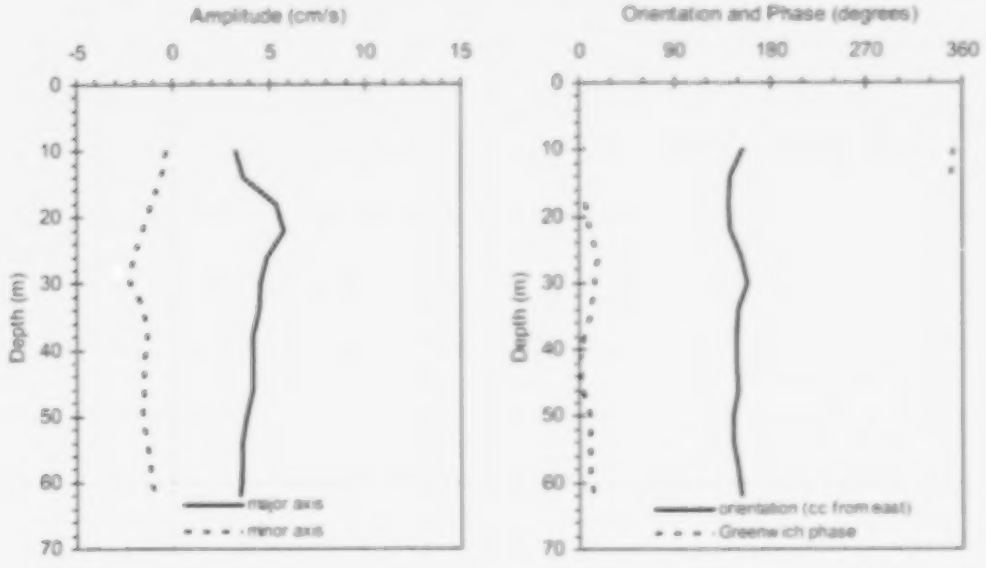


Figure 47 – P1 Tidal Constituent, South-central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

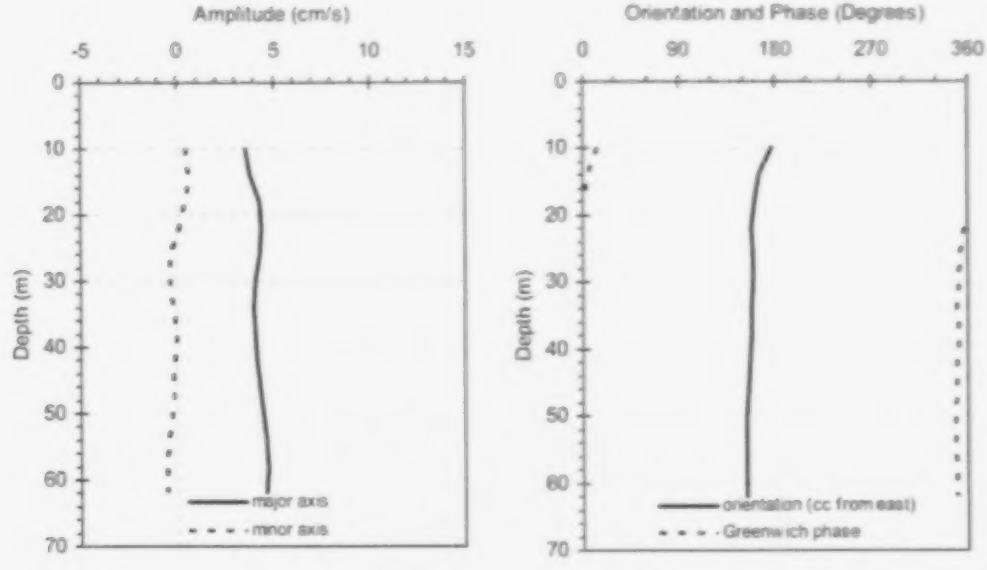
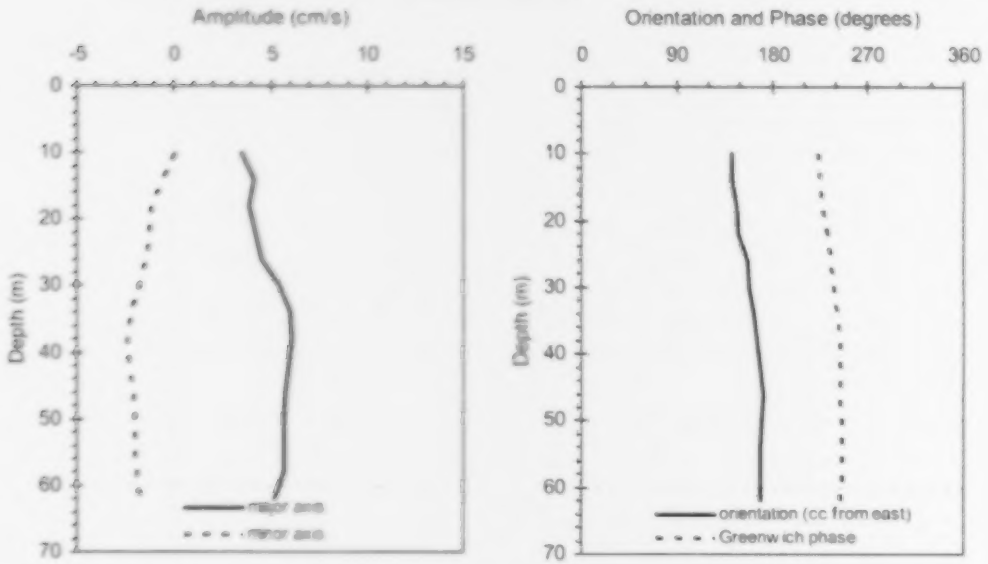


Figure 48 – S2 Tidal Constituent, South-central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

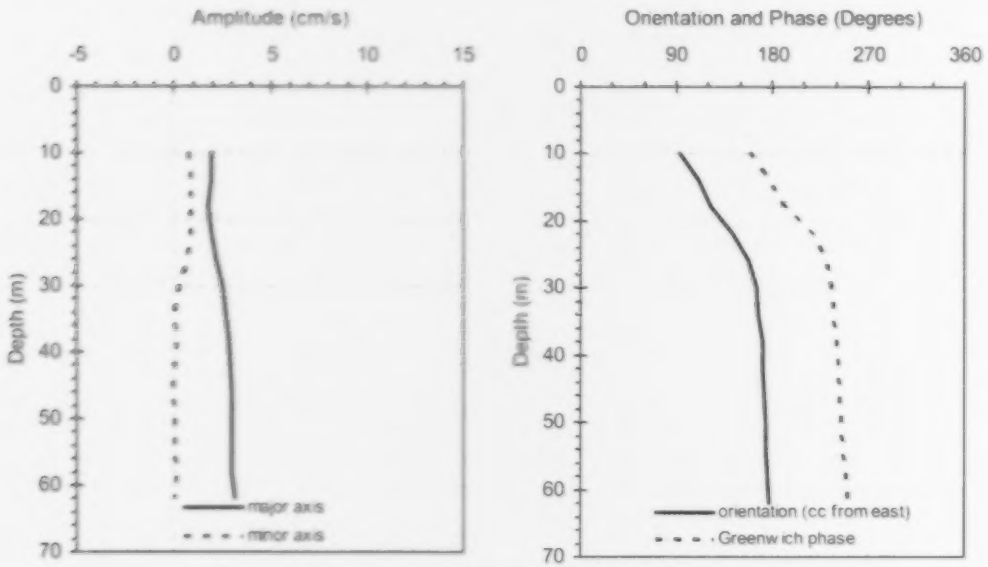
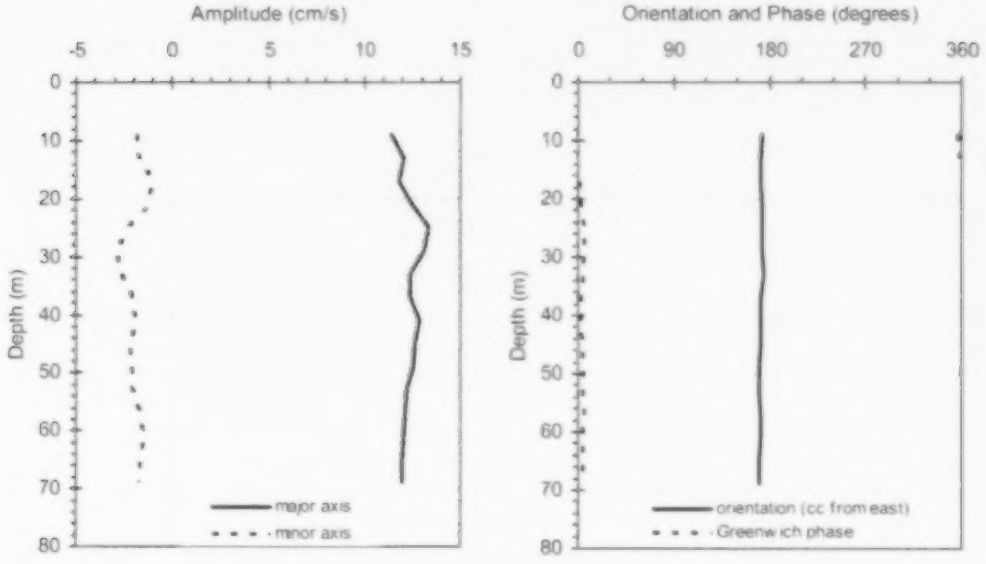


Figure 49 – K1 Tidal Constituent, Central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

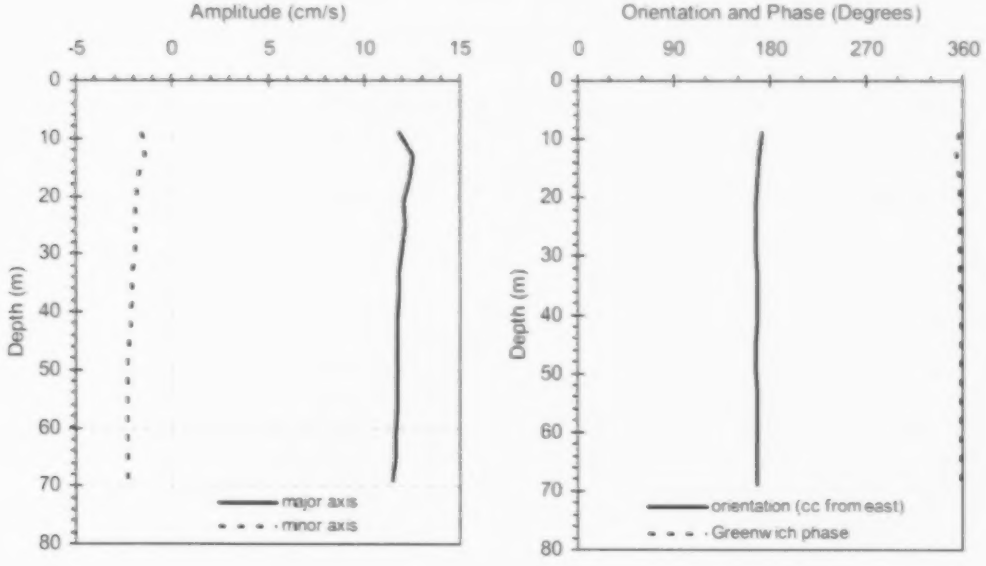
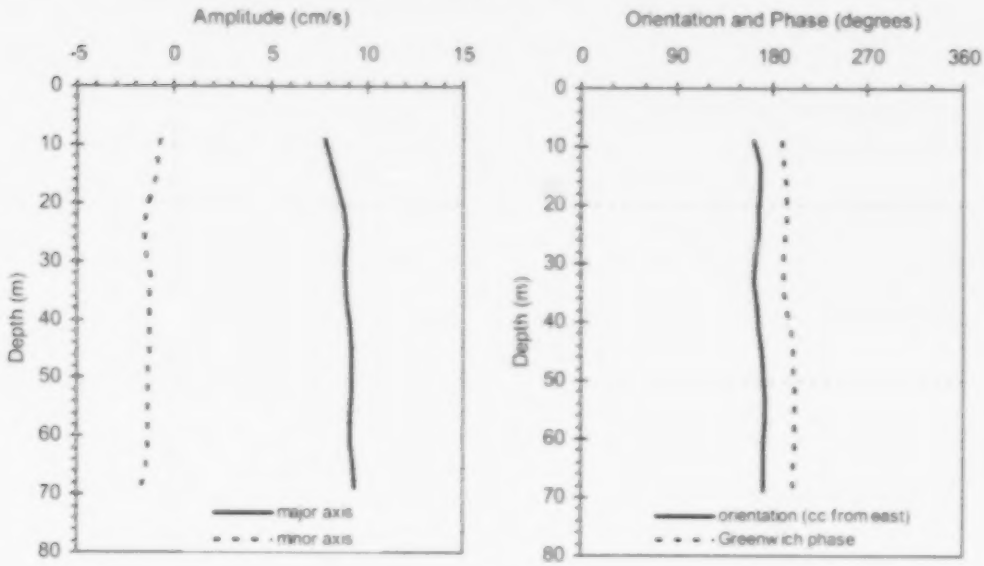


Figure 50 – M2 Tidal Constituent, Central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

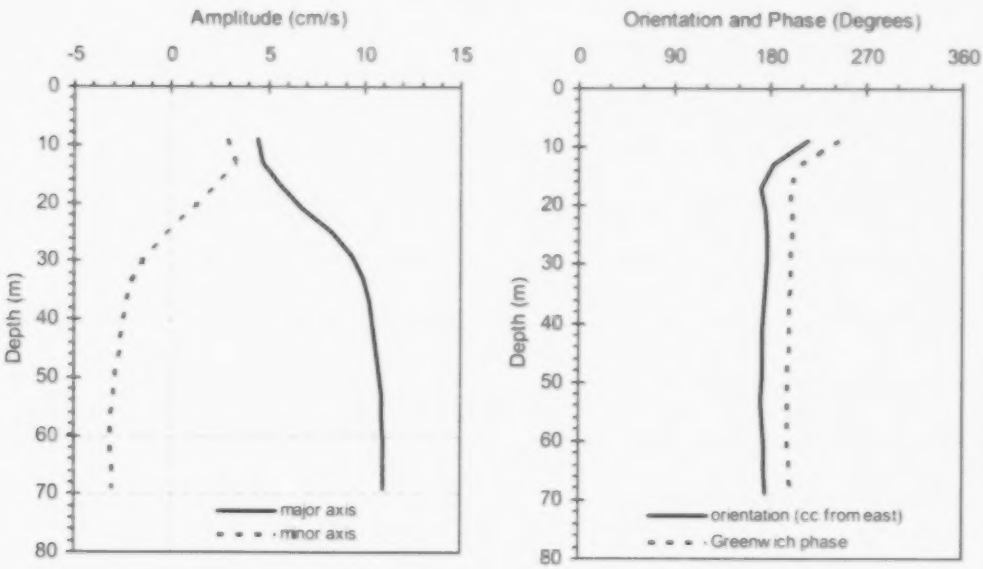
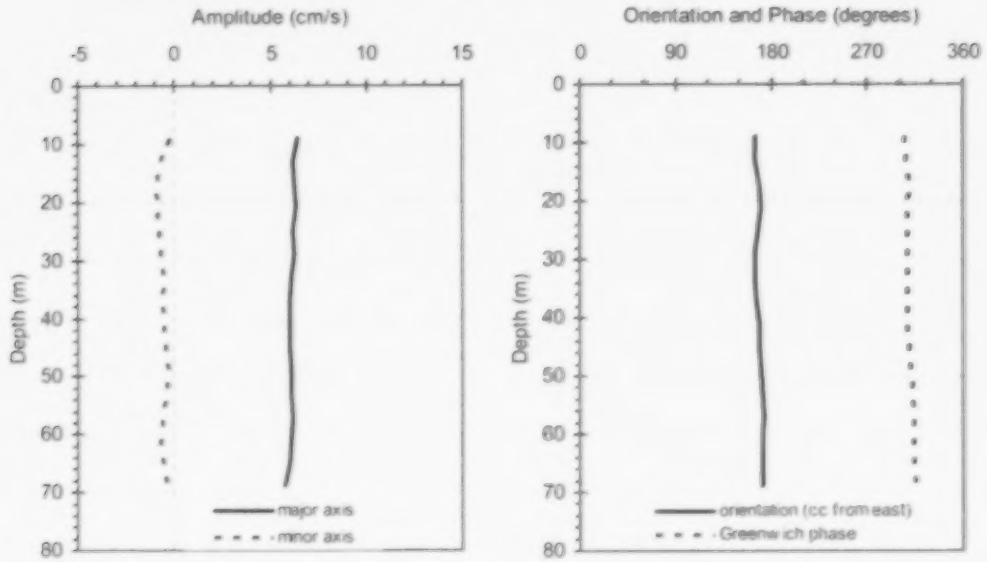


Figure 51 – O1 Tidal Constituent, Central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

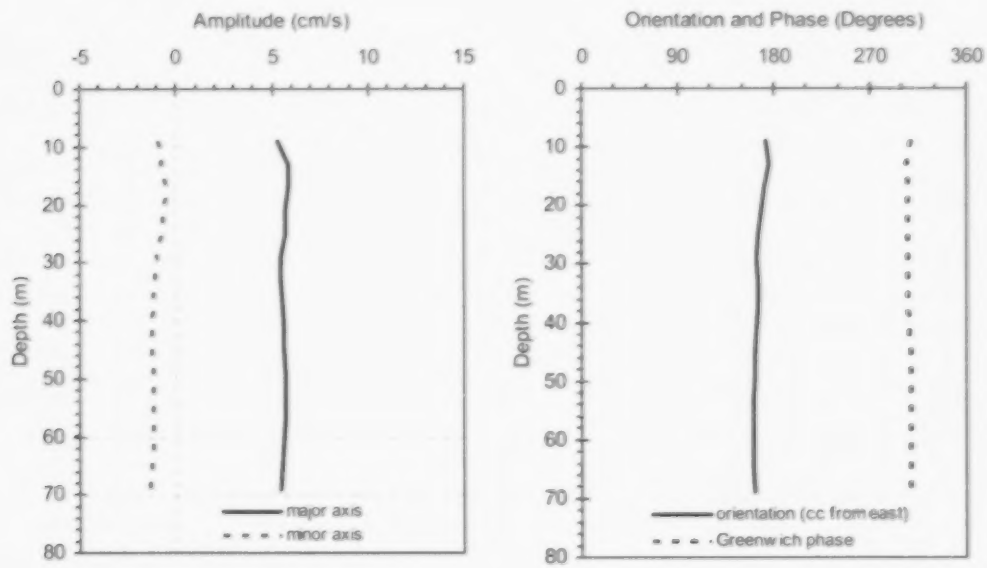
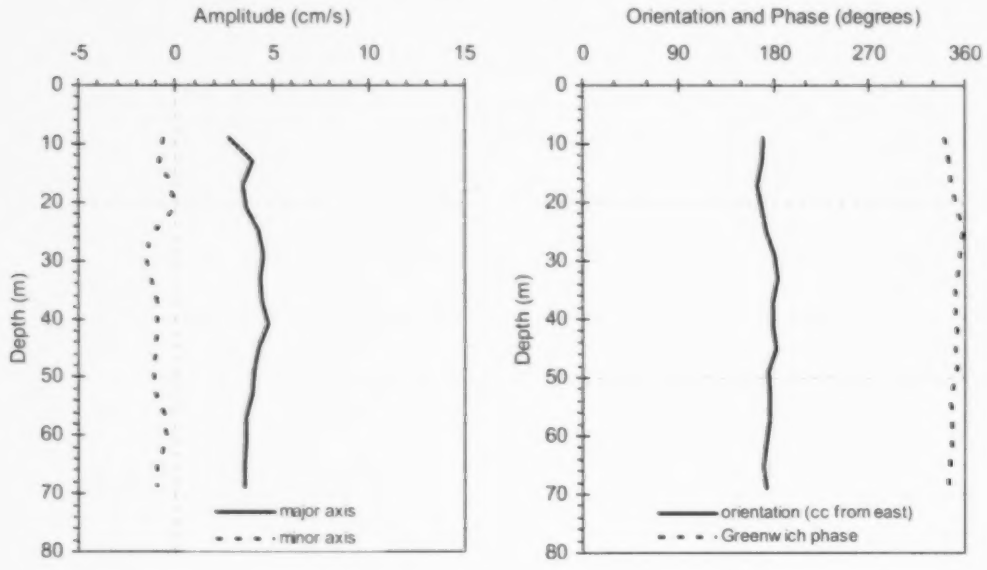


Figure 52 – P1 Tidal Constituent, Central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

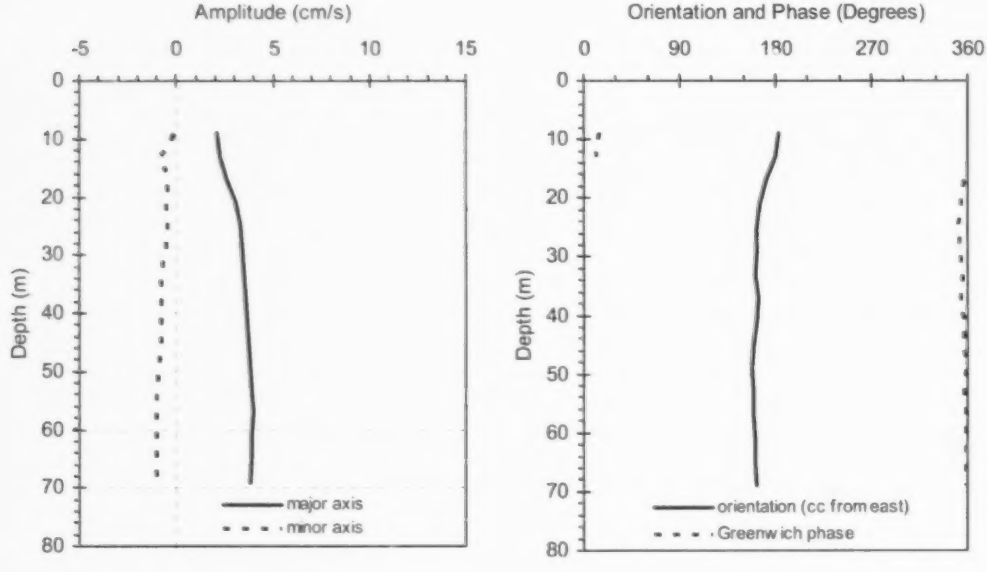
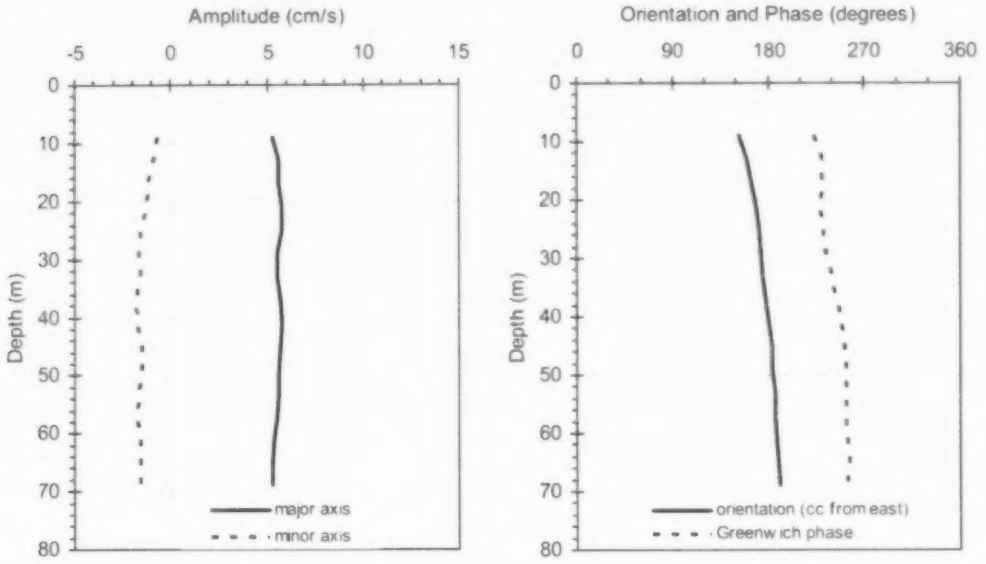


Figure 53 – S2 Tidal Constituent, Central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

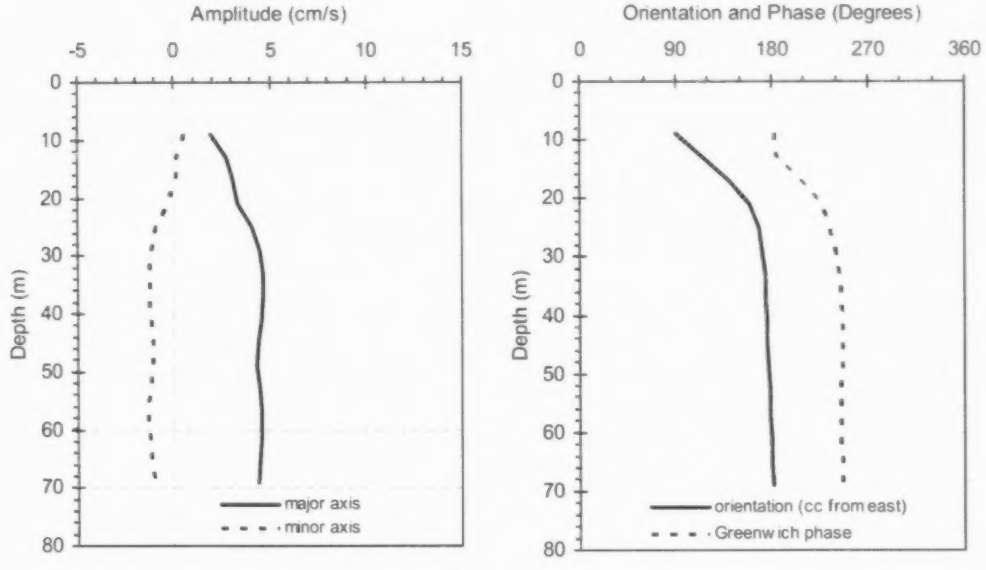
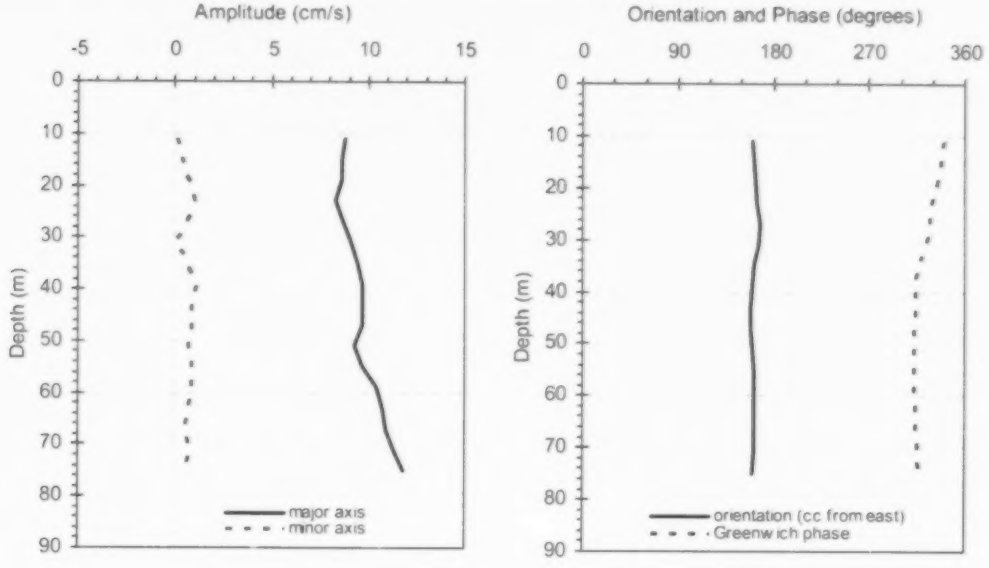


Figure 54 – K1 Tidal Constituent, North Side of Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 17, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

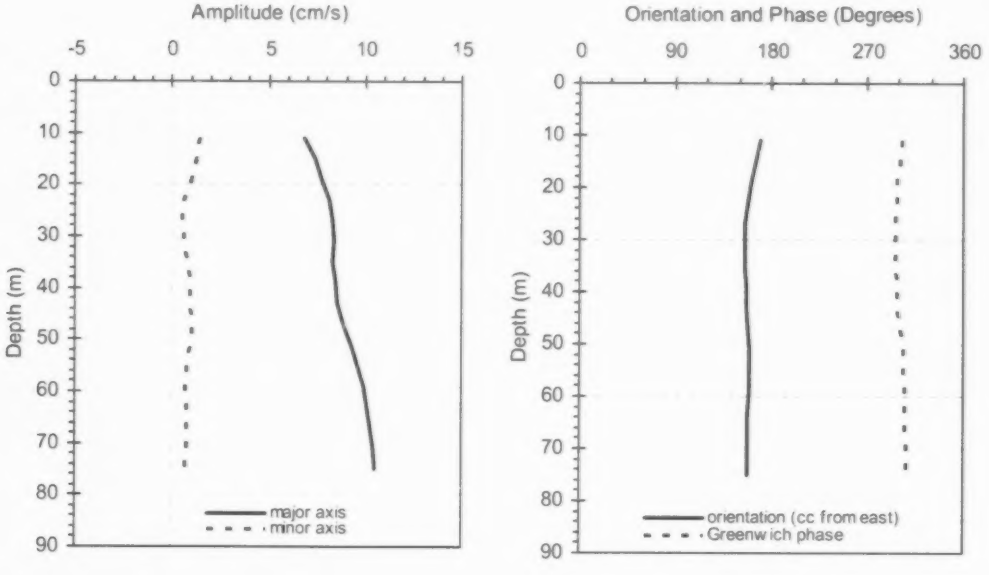
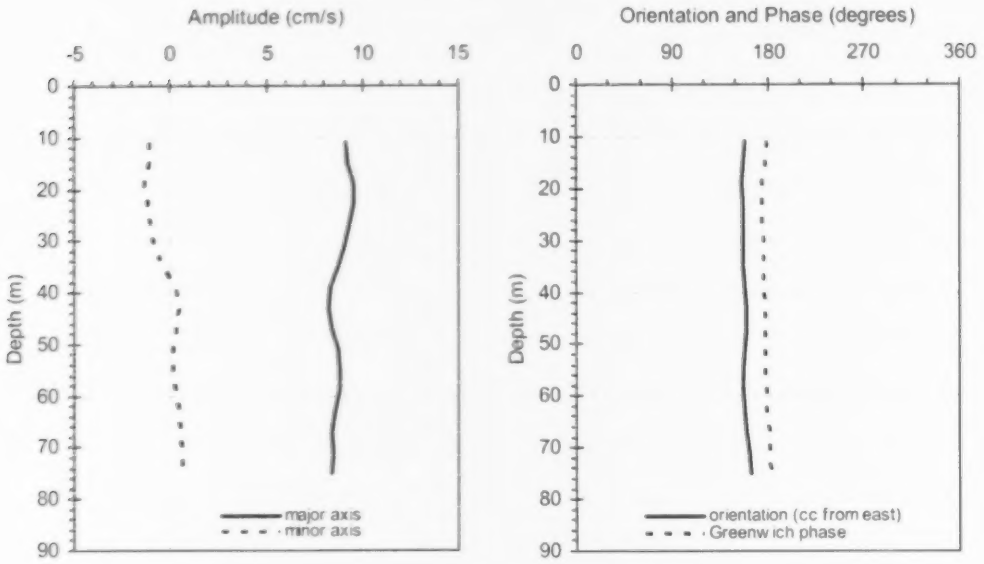


Figure 55 – M2 Tidal Constituent, North Side of Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 17, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

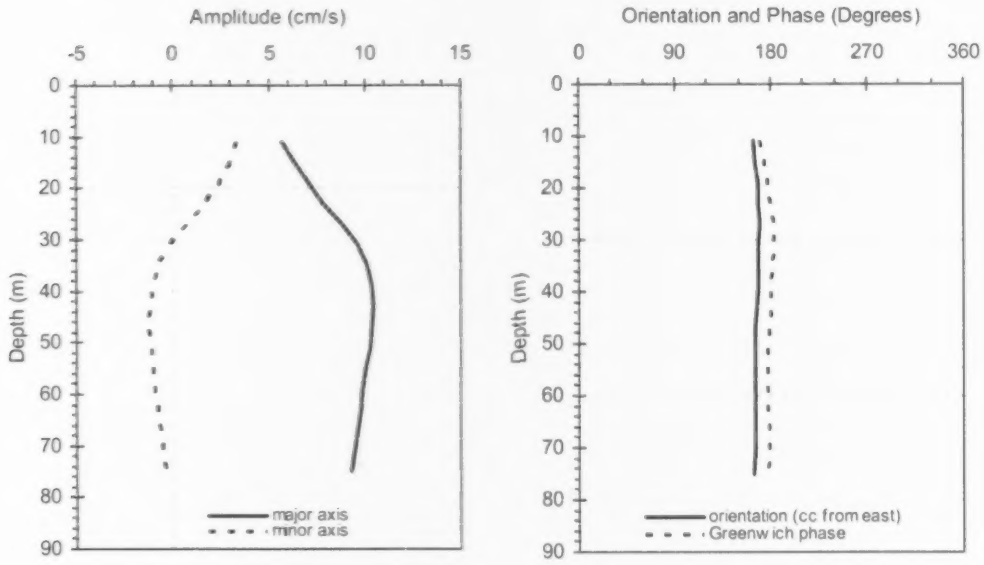
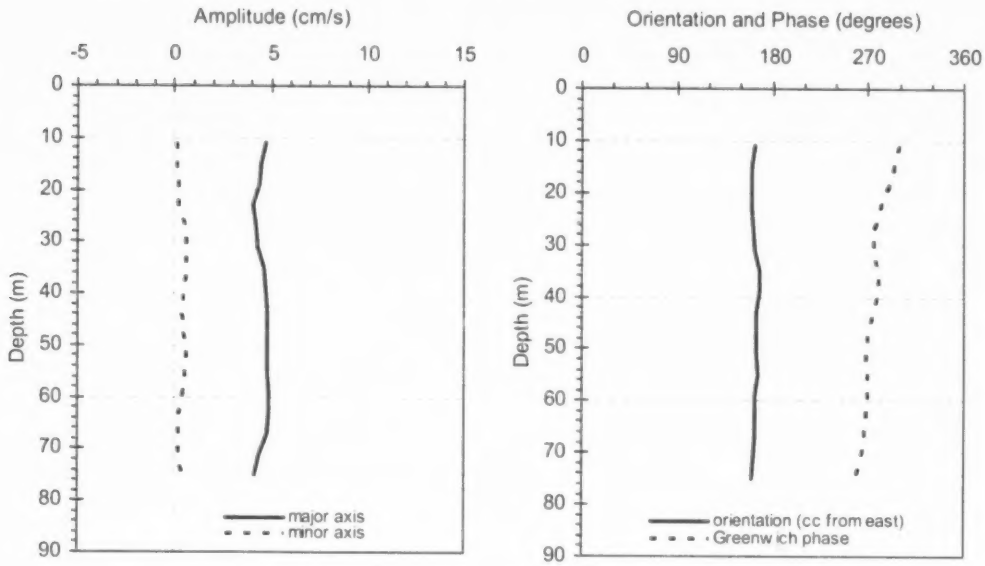


Figure 56 – O1 Tidal Constituent, North Side of Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 17, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

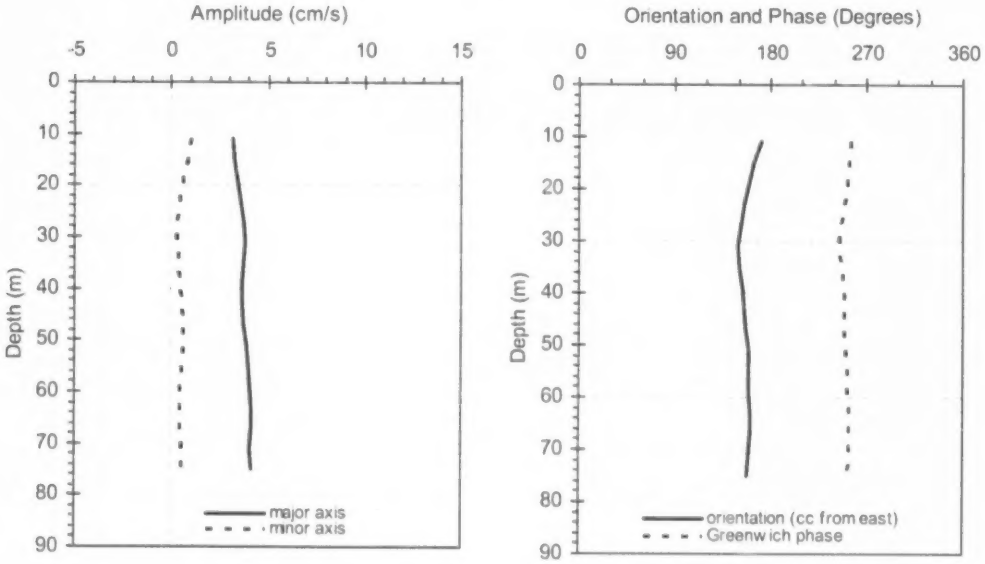
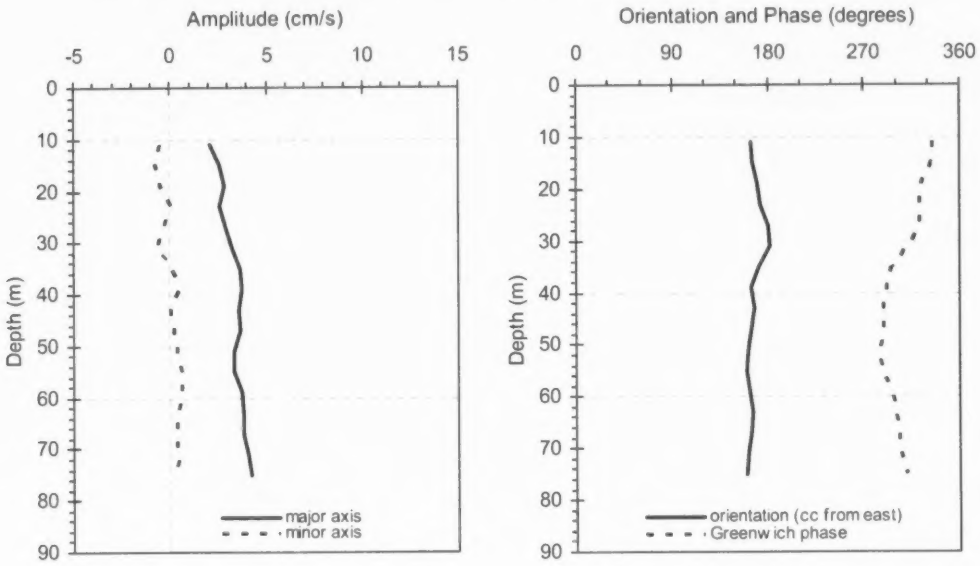


Figure 57 – P1 Tidal Constituent, North Side of Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 17, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

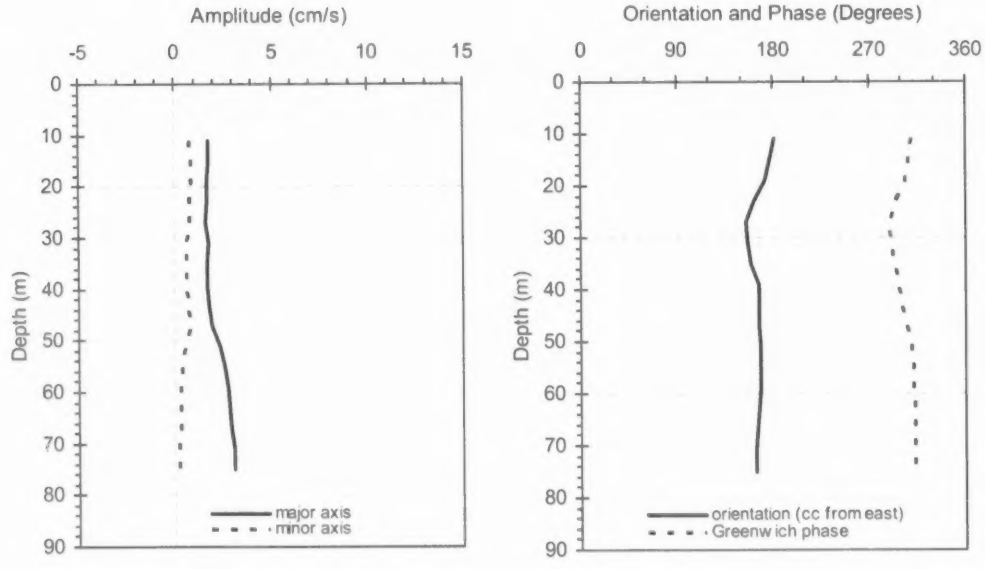
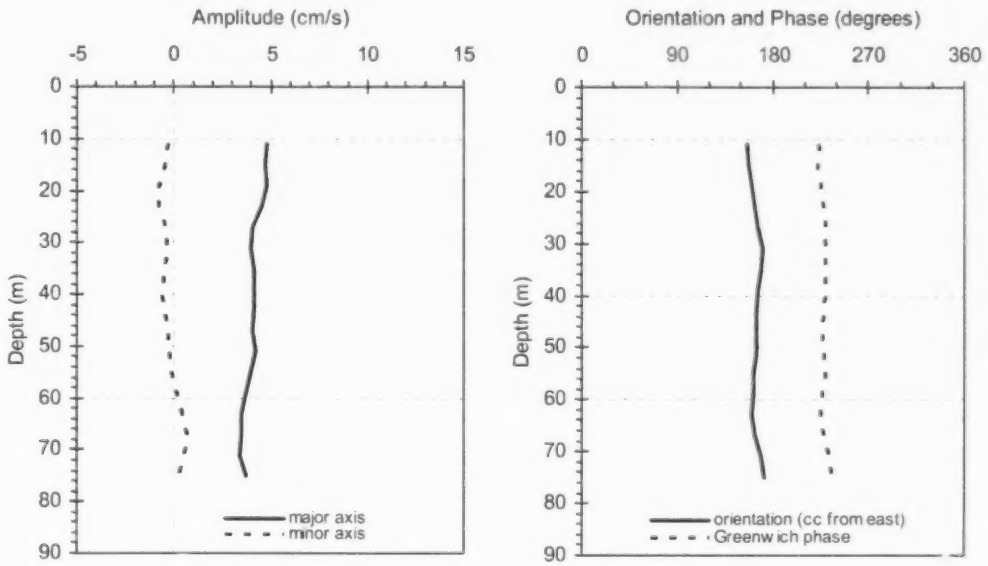


Figure 58 – S2 Tidal Constituent, North Side of Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 17, 2001):



For solid-ice period (Feb 17, 2002 to Jul 6, 2002):

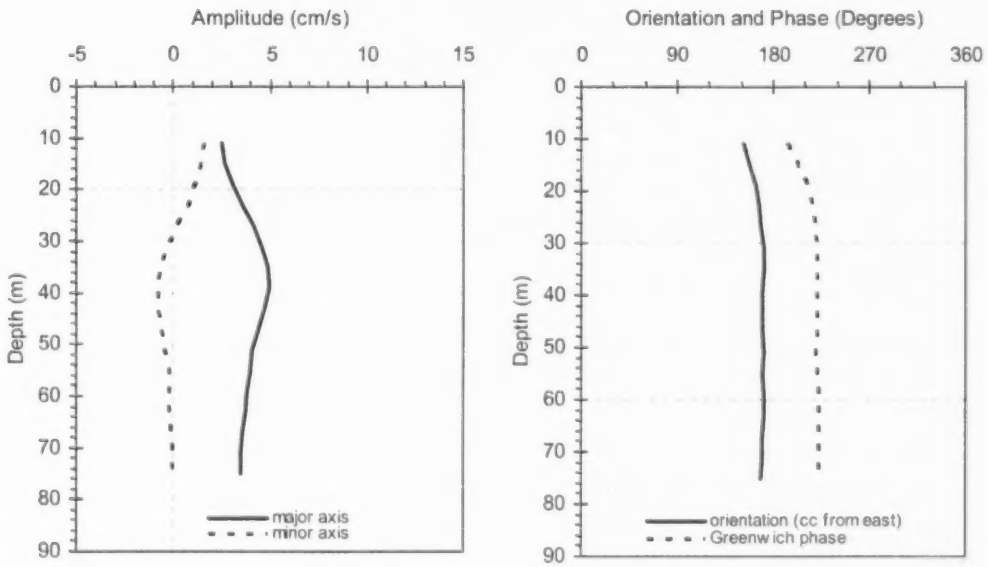


Figure 59 - Ice velocity data, South side of Barrow Strait
August 2001 - August 2002

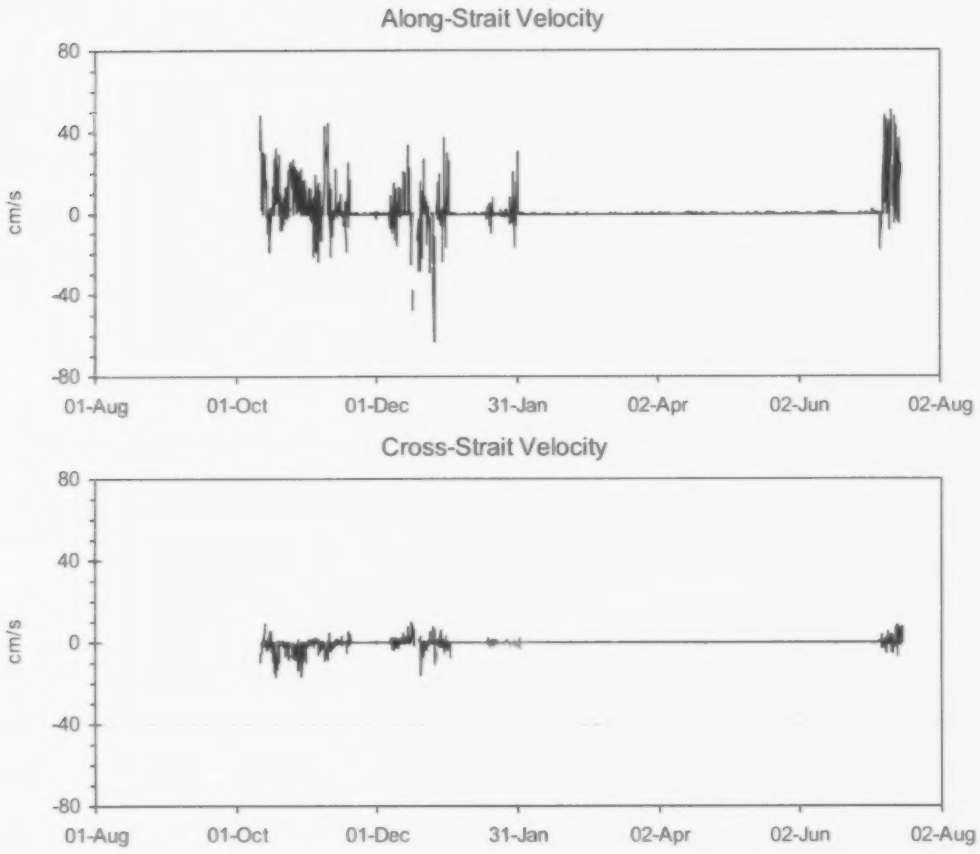


Figure 60 - Ice velocity data, South-central Barrow Strait
August 2001 - August 2002

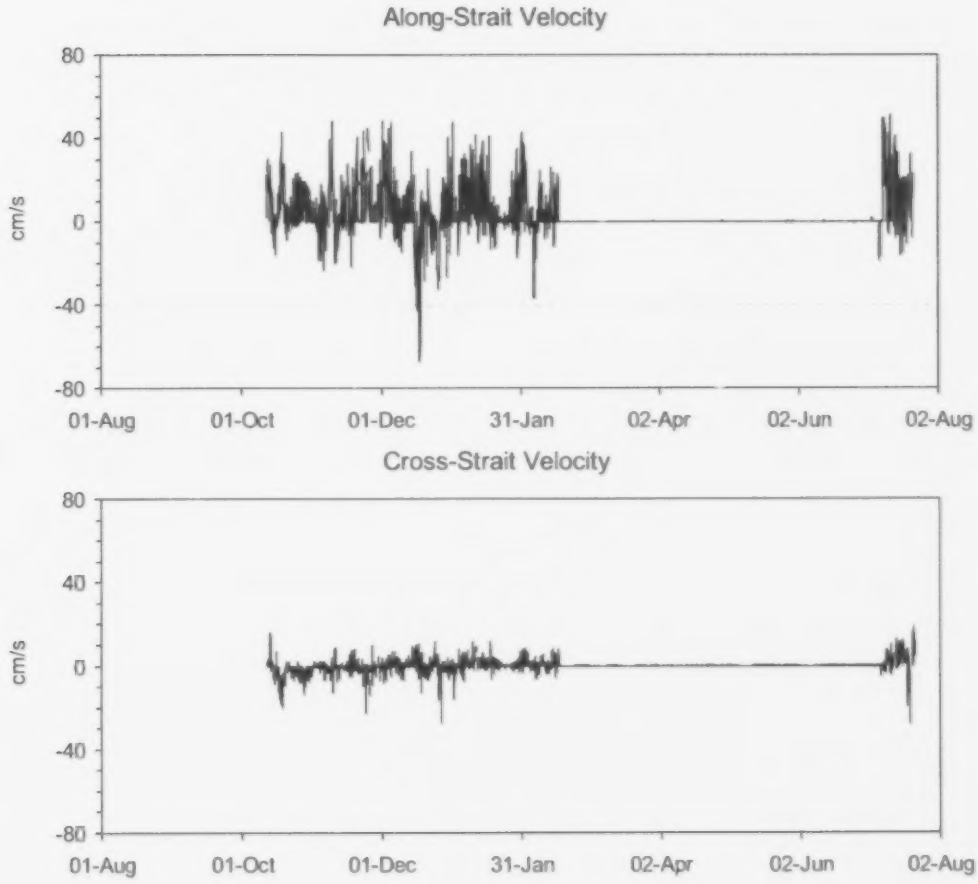


Figure 61 - Ice velocity data, Central Barrow Strait
August 2001 - August 2002

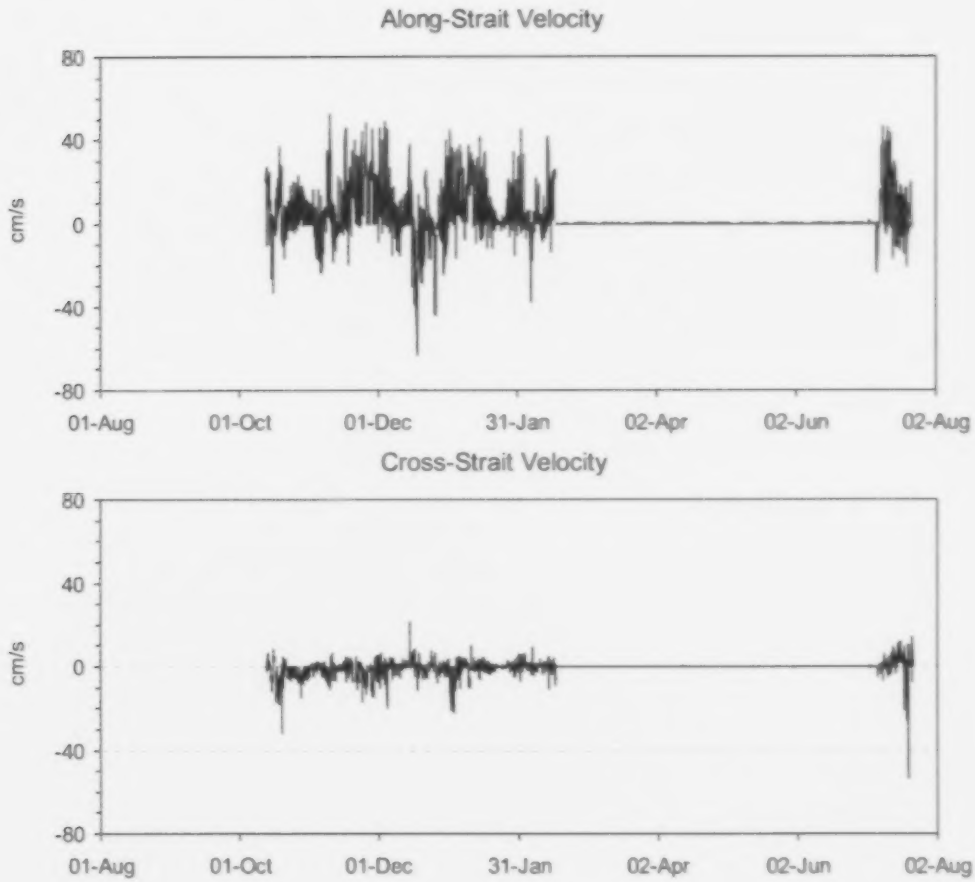


Figure 62 - Ice velocity data, North side of Barrow Strait
August 2001 - August 2002

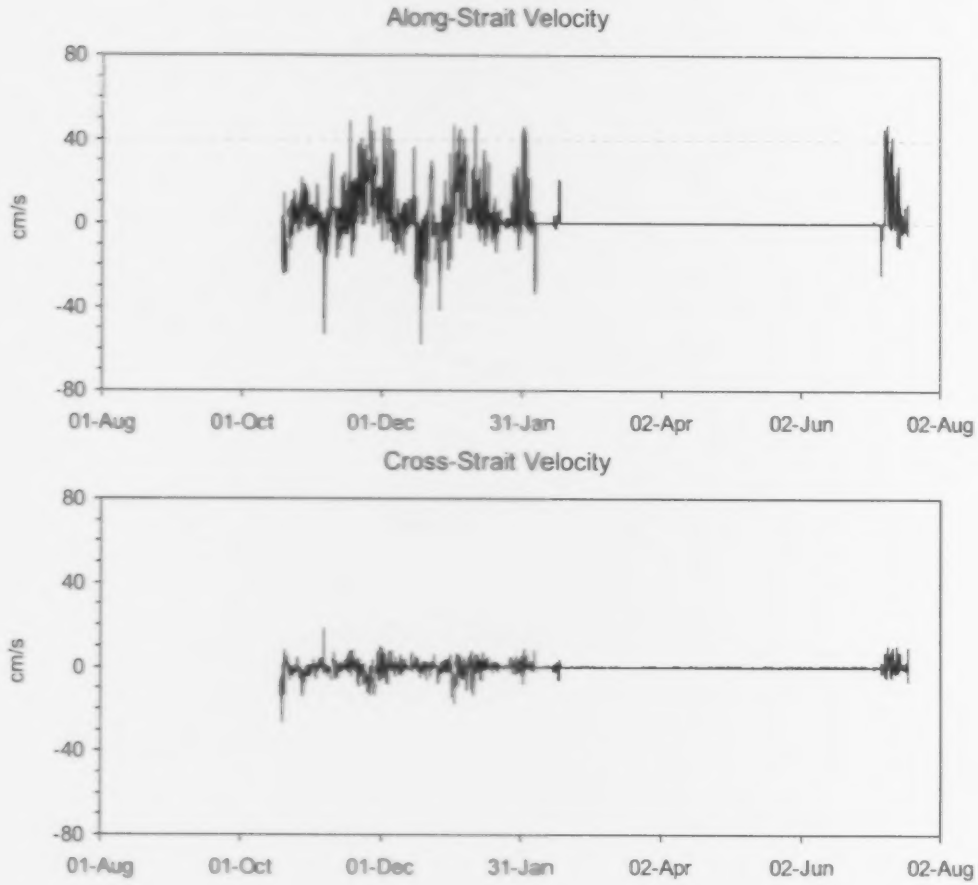


Figure 63 - CTD Station Positions, August 2002

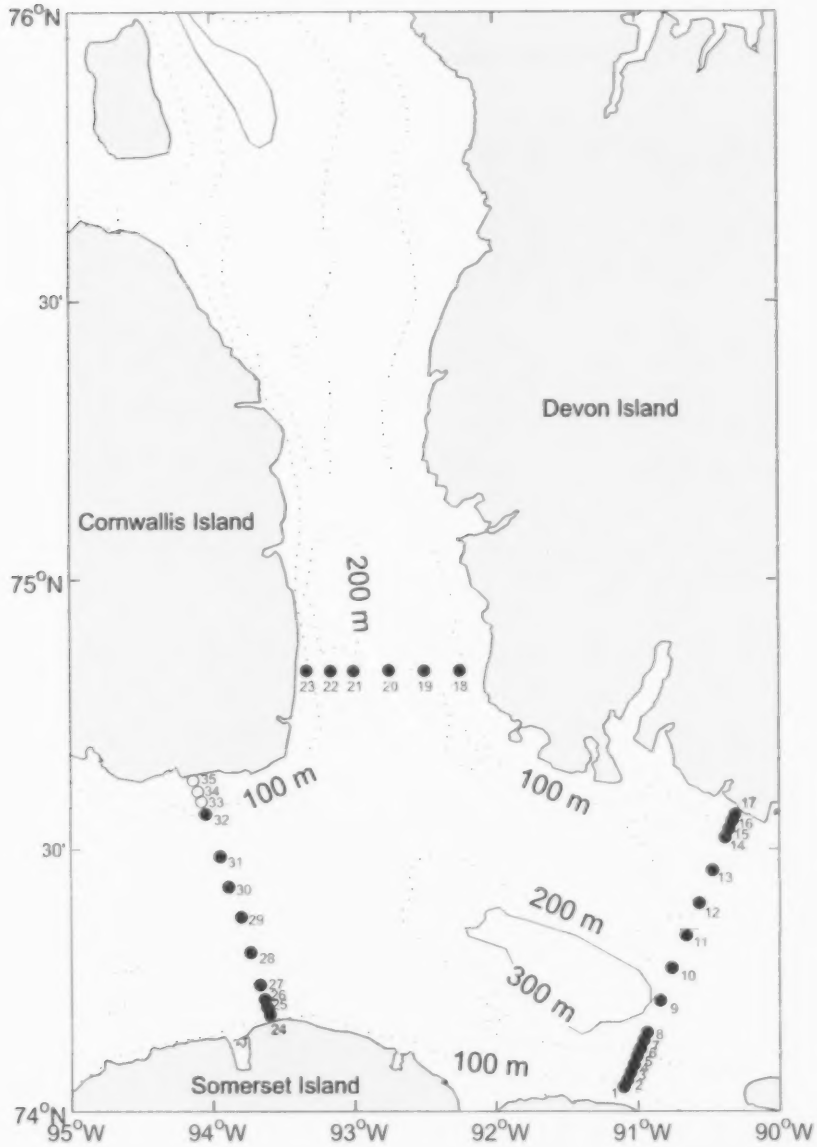


Figure 64 – Eastern Barrow Strait CTD Line, Aug 17-19, 2002.

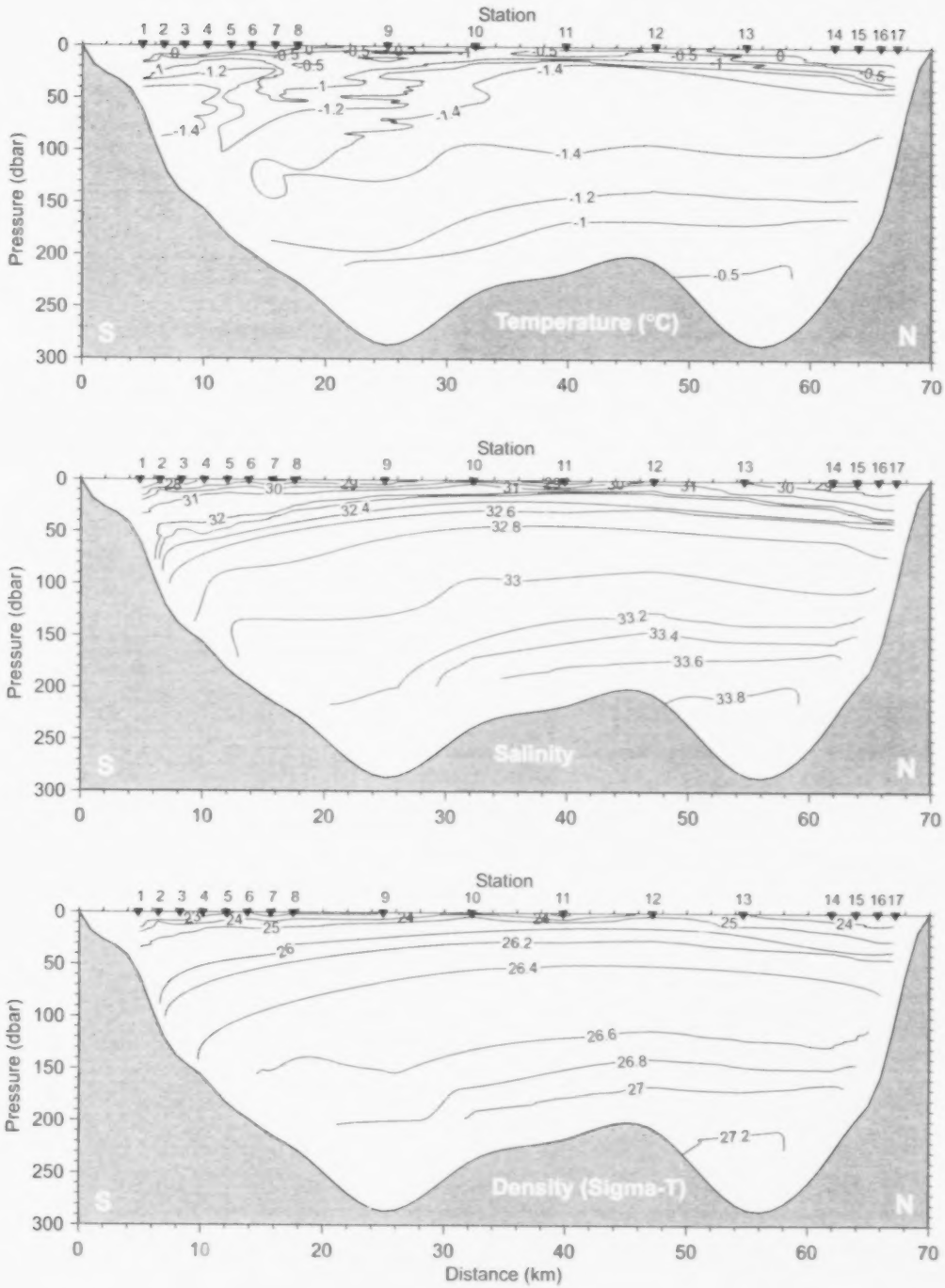

Station
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Pressure (dbar)
0 50 100 150 200 250 300
0 10 20 30 40 50 60 70
Temperature (°C)
S
N
Salinity
Density (Sigma-T)
Distance (km)

Figure 65 – Western Barrow Strait CTD Line, Aug 22, 2002.

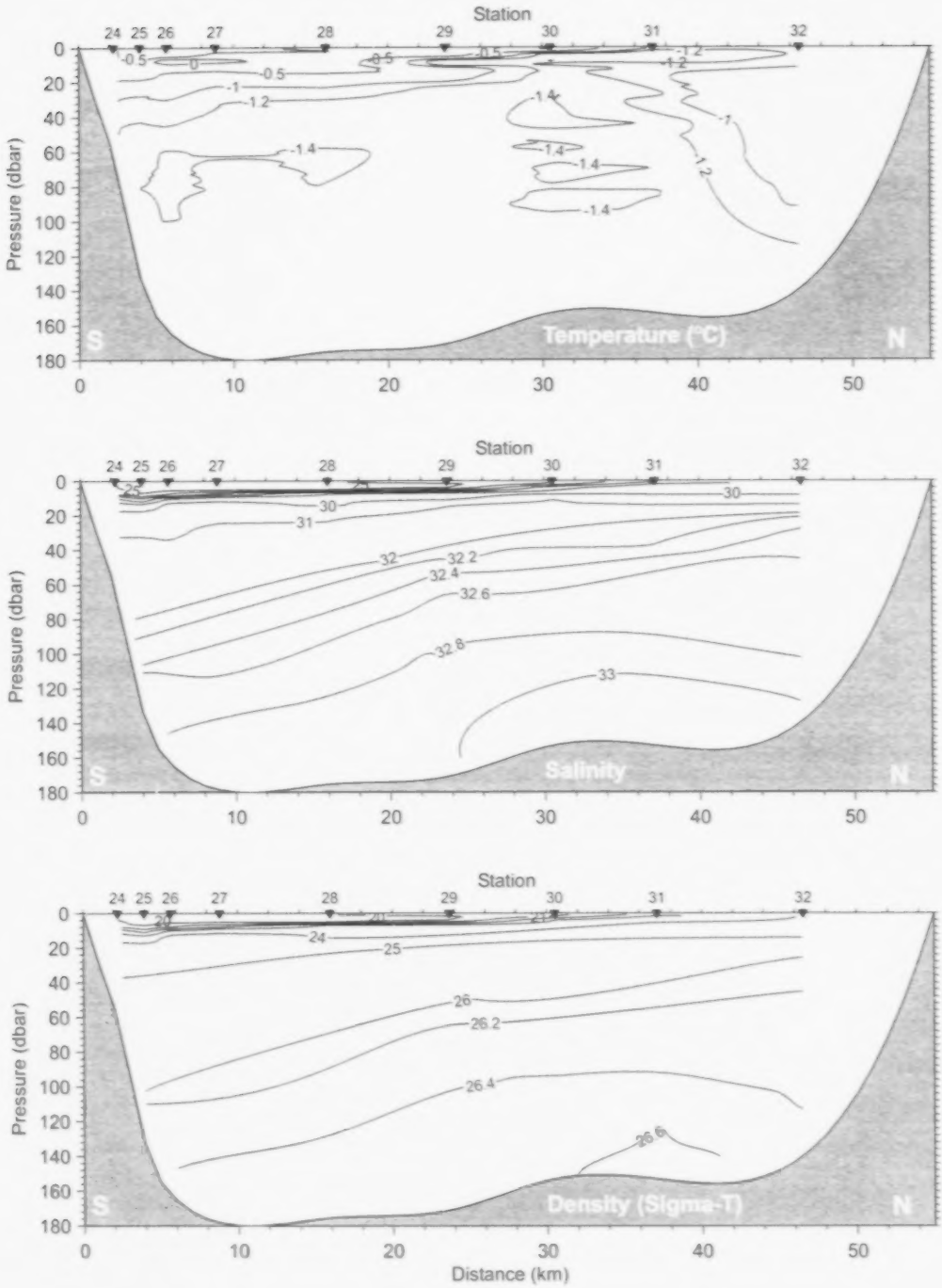


Figure 66 – Wellington Channel CTD Line, Aug 21, 2002.

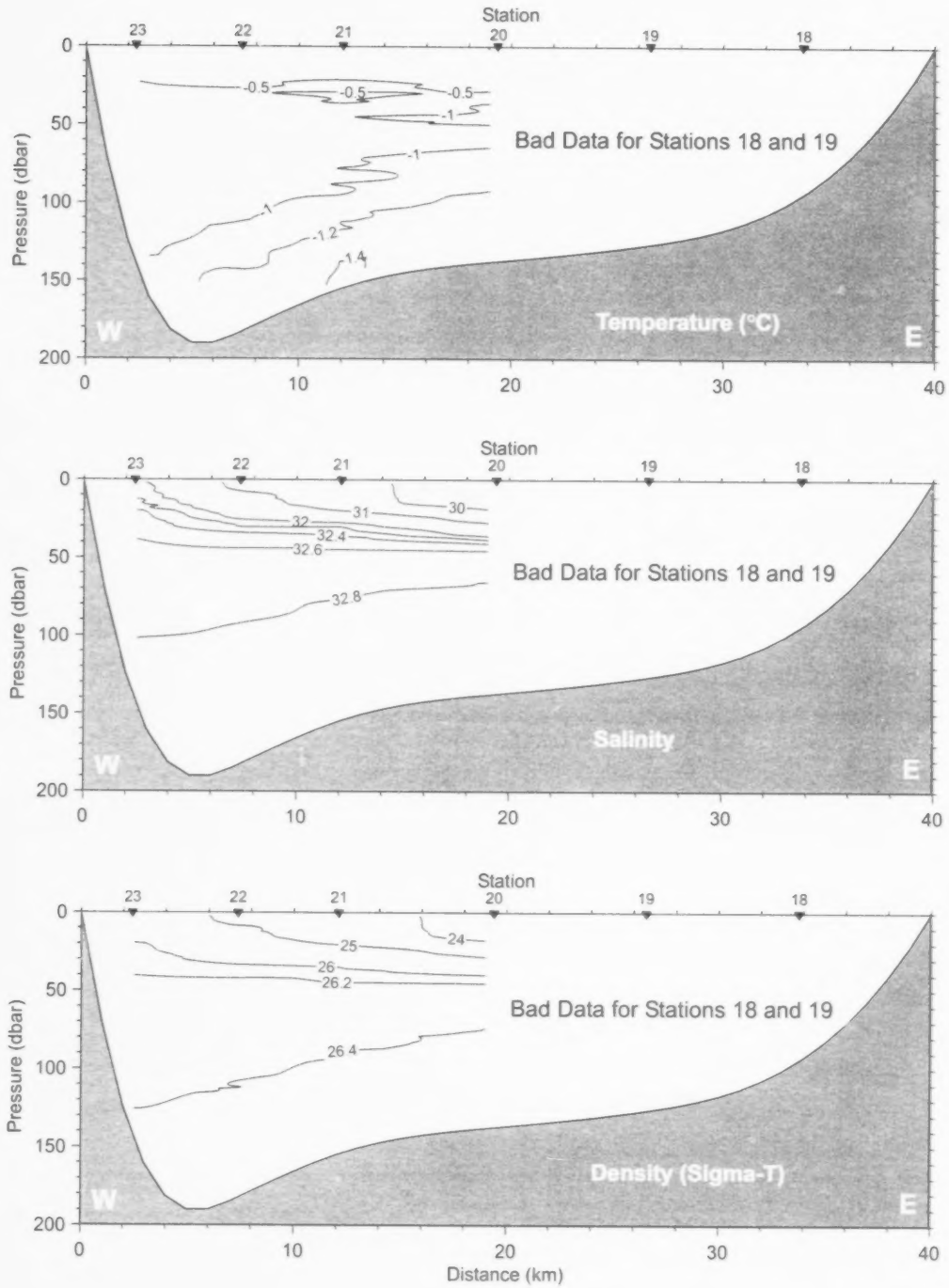


Table 1: South Barrow Strait, Microcat/ADCP statistical summary
Late Summer: August 28 - September 20, 2001

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
32	30	-1.18	0.12	-1.42	-0.78	31.64	0.17	30.74	32.16	25.44	0.14	24.70	25.86	26.31	15.01	-20.04	65.53	0.04	6.20	-18.13	13.57
78	70	-1.37	0.07	-1.47	-0.91	32.51	0.13	32.19	32.82	26.15	0.11	25.89	26.40	19.65	14.04	-26.69	50.83	-0.43	5.03	-15.51	21.62
144	136	-1.29	0.13	-1.50	-0.68	32.95	0.19	32.66	33.60	26.50	0.15	26.26	27.00	5.77	13.36	-37.06	33.92	0.99	4.72	-12.97	15.39

Table 2: South-Central Barrow Strait, Microcat/ADCP statistical summary
Late Summer: August 28 - September 20, 2001

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	34	-1.21	0.19	-1.47	-0.58	32.23	0.27	31.36	32.66	25.91	0.22	25.20	26.26	10.92	13.70	-23.03	46.69	1.14	6.83	-17.82	29.06
70	62	-1.31	0.15	-1.54	-0.58	32.73	0.11	32.31	32.97	26.32	0.09	25.99	26.53	8.68	13.67	-23.31	45.15	0.56	5.90	-13.87	24.14
149		-1.30	0.10	-1.64	-0.84	33.15	0.09	32.93	33.53	26.66	0.07	26.49	26.96								
267		-0.42	0.13	-0.92	-0.24	33.73	0.07	33.43	33.82	27.10	0.05	26.88	27.17								

Table 3: Central Barrow Strait, Microcat/ADCP statistical summary
Late Summer: August 28 - September 20, 2001

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	33	-1.35	0.13	-1.58	-0.88	32.50	0.08	32.28	32.67	26.13	0.06	25.95	26.28	0.61	13.04	-29.88	28.88	-2.49	5.60	-19.22	12.60
77	69	-1.49	0.08	-1.64	-1.27	32.85	0.03	32.67	32.96	26.43	0.03	26.27	26.52	1.13	13.21	-32.18	35.26	-4.01	5.83	-22.05	7.49
157		-1.19	0.10	-1.41	-0.81	33.28	0.10	33.13	33.61	26.77	0.08	26.65	27.02								

Table 4: North side Barrow Strait, Microcat/ADCP statistical summary
Late Summer: August 28 - September 20, 2001

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	39	No Data, Instrument not moored until Sept 25, 2001.												-3.84	11.17	-32.13	28.80	1.11	3.54	-10.93	9.71
83	75	-1.52	0.06	-1.62	-1.29	32.85	0.05	32.59	32.96	26.43	0.04	26.21	26.52	-1.76	11.79	-34.49	21.74	0.80	2.64	-6.22	9.37
160		No Data, Instrument not moored until Sept 25, 2001.																			

Table 5: South Barrow Strait, Microcat/ADCP statistical summary
Fall: September 21 - December 20, 2001

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
32	30	-1.54	0.20	-1.78	-0.95	31.39	0.47	29.59	32.87	25.24	0.38	23.78	26.44	11.26	21.62	-47.25	100.60	-1.12	5.27	-26.08	30.45
78	70	-1.37	0.07	-1.76	-1.08	32.54	0.15	31.90	33.13	26.17	0.12	25.66	26.64	10.60	18.19	-44.06	78.71	-1.31	5.51	-21.32	15.73
144	136	-1.17	0.21	-1.40	-0.58	33.04	0.29	32.49	33.69	26.57	0.23	26.13	27.07	4.31	14.90	-50.57	50.54	0.39	5.14	-17.50	19.41

Table 6: South-Central Barrow Strait, Microcat/ADCP statistical summary
Fall: September 21 - December 20, 2001

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	34	-1.52	0.23	-1.76	-0.84	31.93	0.27	31.16	32.62	25.68	0.22	25.05	26.23	7.04	14.68	-34.91	58.46	0.62	5.78	-18.34	32.46
70	62	-1.40	0.16	-1.76	-0.75	32.55	0.22	31.88	32.88	26.18	0.17	25.64	26.45	5.92	15.10	-39.97	52.49	0.39	5.88	-16.21	30.68
149		-1.32	0.07	-1.55	-0.89	33.06	0.10	32.68	33.52	26.59	0.08	26.28	26.95								
267		-0.41	0.17	-1.10	0.06	33.73	0.10	33.20	33.98	27.10	0.07	26.70	27.29								

Table 7: Central Barrow Strait, Microcat/ADCP statistical summary
Fall: September 21 - December 20, 2001

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	33	-1.50	0.19	-1.77	-0.90	32.08	0.22	31.29	32.61	25.80	0.18	25.17	26.23	0.90	14.91	-40.17	47.30	-0.28	6.31	-25.56	34.72
77	69	-1.44	0.10	-1.77	-1.07	32.68	0.12	32.26	32.88	26.28	0.10	25.95	26.45	-0.09	15.15	-41.04	46.54	-0.10	5.87	-25.19	25.90
157		-1.27	0.08	-1.45	-0.85	33.16	0.09	32.96	33.59	26.67	0.07	26.52	27.00								

Table 8: North Side Barrow Strait, Microcat/ADCP statistical summary
Fall: September 21 - December 20, 2001

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	39	-1.47	0.21	-1.78	-0.95	32.03	0.53	30.40	32.74	25.76	0.43	24.44	26.34	-8.06	14.71	-74.81	24.63	0.64	5.32	-24.03	20.25
83	75	-1.45	0.07	-1.77	-1.06	32.71	0.10	32.19	32.93	26.31	0.08	25.88	26.49	-4.02	13.15	-46.55	26.04	0.62	4.25	-21.08	22.17
160		-1.27	0.13	-1.62	-0.89	33.15	0.17	32.57	33.63	26.66	0.14	26.20	27.04								

Table 9: South Barrow Strait, Microcat/ADCP statistical summary
Winter: December 21, 2001 - March 20, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
32	30	-1.73	0.03	-1.79	-1.54	32.06	0.16	31.56	32.35	25.79	0.13	25.38	26.02	4.81	10.61	-29.17	42.86	-0.64	3.99	-18.36	14.71
78	70	-1.55	0.12	-1.77	-1.31	32.51	0.11	32.11	32.77	26.15	0.09	25.83	26.36	5.93	13.84	-37.26	45.48	-1.05	5.66	-19.73	15.90
144	136	-1.32	0.13	-1.65	-0.97	32.93	0.17	32.57	33.34	26.49	0.14	26.20	26.81	0.99	14.39	-49.26	33.84	-0.05	4.46	-16.30	12.54

Table 10: South-Central Barrow Strait, Microcat/ADCP statistical summary
Winter: December 21, 2001 - March 20, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	34	-1.71	0.06	-1.78	-1.44	32.20	0.17	31.77	32.62	25.90	0.14	25.55	26.25	4.25	13.97	-30.80	46.49	1.80	4.98	-11.72	19.30
70	62	-1.65	0.06	-1.77	-1.34	32.55	0.14	32.07	32.83	26.19	0.11	25.79	26.41	2.63	14.49	-34.73	48.07	1.49	5.57	-15.16	23.26
149		-1.46	0.14	-1.76	-1.14	32.88	0.09	32.59	33.22	26.45	0.07	26.21	26.71								
267		-0.56	0.19	-1.29	-0.13	33.64	0.13	32.92	33.86	27.03	0.10	26.48	27.19								

Table 11: Central Barrow Strait, Microcat/ADCP statistical summary
Winter: December 21, 2001 - March 20, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	33	-1.72	0.06	-1.78	-1.41	32.28	0.18	31.82	32.67	25.96	0.14	25.59	26.28	5.64	13.82	-31.10	47.10	1.71	4.96	-14.92	15.80
77	69	-1.67	0.07	-1.79	-1.36	32.64	0.13	32.29	32.91	26.26	0.11	25.97	26.48	4.92	14.41	-33.80	55.80	1.40	5.48	-15.84	20.67
157		-1.28	0.09	-1.65	-0.94	33.08	0.11	32.86	33.42	26.60	0.09	26.43	26.87								

Table 12: North Barrow Strait, Microcat/ADCP statistical summary
Winter: December 21, 2001 - March 20, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	39	-1.76	0.03	-1.80	-1.55	32.58	0.12	32.27	32.80	26.21	0.10	25.96	26.39	2.15	11.53	-30.38	34.45	0.86	3.58	-10.72	14.93
83	75	-1.66	0.10	-1.78	-1.34	32.71	0.11	32.44	33.01	26.32	0.09	26.10	26.55	1.69	12.03	-34.66	30.43	0.98	3.72	-9.93	12.82
160		-1.16	0.16	-1.49	-0.66	33.27	0.22	32.72	33.75	26.76	0.17	26.32	27.13								

Table 13: South Barrow Strait, Microcat/ADCP statistical summary
Spring: March 21 - June 20, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
32	30	-1.65	0.06	-1.75	-1.43	32.10	0.11	31.89	32.38	25.82	0.09	25.65	26.05	8.88	9.21	-30.87	35.41	-0.75	3.89	-13.32	11.39
78	70	-1.50	0.11	-1.72	-1.33	32.58	0.06	32.30	32.77	26.21	0.05	25.98	26.36	12.80	14.94	-41.77	60.95	-1.18	5.37	-19.02	20.19
144	136	-1.36	0.18	-1.69	-0.65	32.85	0.21	32.63	33.63	26.42	0.17	26.25	27.03	5.26	12.99	-42.34	37.96	0.96	4.34	-20.17	17.30

Table 14: South-Central Barrow Strait, Microcat/ADCP statistical summary
Spring: March 21 - June 20, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	34	-1.69	0.06	-1.77	-1.46	32.16	0.19	31.63	32.62	25.87	0.15	25.44	26.24	9.77	14.29	-38.36	47.00	2.72	6.15	-17.98	20.43
70	62	-1.61	0.07	-1.77	-1.33	32.64	0.07	32.27	32.89	26.26	0.06	25.96	26.46	8.19	14.72	-34.56	49.26	2.04	6.57	-19.72	25.78
149		-1.50	0.17	-1.77	-1.09	32.90	0.06	32.67	33.31	26.47	0.05	26.28	26.79								
267		-0.46	0.13	-1.28	-0.14	33.72	0.09	33.02	33.95	27.09	0.07	26.56	27.27								

Table 15: Central Barrow Strait, Microcat/ADCP statistical summary
Spring: March 21 - June 20, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	33	-1.68	0.07	-1.78	-1.44	32.33	0.19	31.83	32.75	26.01	0.15	25.61	26.35	6.57	13.97	-30.74	42.64	2.22	7.12	-28.41	19.17
77	69	-1.63	0.08	-1.79	-1.33	32.77	0.05	32.58	32.98	26.37	0.04	26.20	26.53	4.95	14.26	-38.86	43.04	2.26	7.48	-21.78	19.79
157		-1.33	0.14	-1.77	-0.89	33.06	0.12	32.80	33.49	26.59	0.10	26.39	26.92								

Table 16: North Barrow Strait, Microcat/ADCP statistical summary
Spring: March 21 - June 20, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	39	-1.75	0.03	-1.79	-1.56	32.41	0.21	31.93	32.78	26.08	0.17	25.69	26.38	2.61	11.94	-36.58	32.13	1.04	3.94	-12.55	12.65
83	75	-1.69	0.06	-1.78	-1.33	32.85	0.03	32.69	33.09	26.43	0.03	26.30	26.62	4.14	12.74	-30.41	36.78	0.76	3.79	-11.40	15.38
160		-1.15	0.11	-1.46	-0.72	33.46	0.09	33.16	33.78	26.91	0.07	26.67	27.17								

Table 17: South Barrow Strait, Microcat/ADCP statistical summary
Early Summer: June 21 - August 16, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
32	30	-1.47	0.22	-1.75	0.21	31.85	0.29	30.84	32.37	25.61	0.24	24.75	26.04	29.45	18.24	-15.33	90.31	0.31	6.74	-29.67	24.50
78	70	-1.43	0.09	-1.69	-0.93	32.48	0.12	32.12	32.78	26.12	0.10	25.83	26.37	26.38	16.23	-28.29	70.03	0.06	6.15	-18.03	19.92
144	136	-1.38	0.05	-1.55	-1.23	32.69	0.09	32.43	32.91	26.29	0.07	26.08	26.47	10.91	12.46	-26.39	47.82	2.35	5.50	-15.23	20.35

Table 18: South-Central Barrow Strait, Microcat/ADCP statistical summary
Early Summer: June 21 - August 16, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	34	-1.48	0.23	-1.73	-0.40	32.16	0.21	31.12	32.69	25.87	0.17	25.02	26.29	18.26	17.02	-35.13	69.62	6.00	7.95	-18.77	28.44
70	62	-1.51	0.15	-1.73	-0.94	32.66	0.08	32.30	32.86	26.27	0.07	25.97	26.42	15.69	16.79	-33.43	61.21	4.93	7.79	-21.74	26.85
149		-1.39	0.13	-1.69	-1.11	32.96	0.08	32.79	33.33	26.51	0.06	26.38	26.80								
267		-0.58	0.15	-1.21	-0.34	33.63	0.12	33.05	33.79	27.03	0.09	26.58	27.14								

Table 19: Central Barrow Strait, Microcat/ADCP statistical summary
Early Summer: June 21 - August 16, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	33	-1.55	0.16	-1.75	-0.91	32.27	0.25	31.67	32.67	25.96	0.20	25.47	26.27	3.85	15.63	-32.17	51.89	1.76	6.44	-22.58	19.49
77	69	-1.59	0.09	-1.74	-1.27	32.78	0.04	32.60	32.93	26.37	0.03	26.23	26.49	3.49	16.08	-35.16	55.42	2.46	7.25	-20.33	24.42
157		-1.24	0.13	-1.61	-0.78	33.16	0.15	32.91	33.65	26.67	0.12	26.48	27.05								

Table 20: North Barrow Strait, Microcat/ADCP statistical summary
Early Summer: June 21 - August 16, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	39	-1.56	0.22	-1.75	-0.27	32.29	0.31	30.62	32.79	25.97	0.25	24.59	26.38	1.60	13.69	-49.29	29.13	0.60	4.53	-11.48	15.75
83	75	-1.59	0.08	-1.72	-1.32	32.85	0.05	32.63	33.00	26.43	0.04	26.25	26.55	3.27	13.64	-38.88	32.00	0.43	4.18	-11.91	13.31
160		-1.19	0.10	-1.40	-0.72	33.38	0.12	33.05	33.70	26.85	0.09	26.59	27.09								

Table 21: South Barrow Strait, Microcat/ADCP statistical summary
Complete Record: August 27, 2001 - August 16, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
32	30	-1.58	0.20	-1.79	0.21	31.84	0.41	29.59	32.87	25.60	0.33	23.78	26.44	13.33	17.99	-47.25	100.60	-0.59	5.07	-29.67	30.45
78	70	-1.46	0.12	-1.77	-0.91	32.53	0.12	31.90	33.13	26.16	0.10	25.66	26.64	13.14	17.12	-44.06	78.71	-0.93	5.61	-21.32	21.62
144	136	-1.30	0.18	-1.69	-0.58	32.90	0.24	32.43	33.69	26.46	0.19	26.08	27.07	4.87	14.16	-50.57	50.54	0.78	4.87	-20.17	20.35

Table 22: South-Central Barrow Strait, Microcat/ADCP statistical summary
Complete Record: August 27, 2001 - August 16, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	34	-1.59	0.21	-1.78	-0.40	32.12	0.24	31.12	32.69	25.83	0.20	25.02	26.29	9.10	15.43	-38.36	69.62	2.37	6.41	-18.77	32.46
70	62	-1.53	0.16	-1.77	-0.58	32.61	0.15	31.88	32.97	26.23	0.12	25.64	26.53	7.43	15.61	-39.97	61.21	1.84	6.50	-21.74	30.68
149		-1.41	0.15	-1.77	-0.84	32.96	0.12	32.59	33.53	26.51	0.09	26.21	26.96								
267		-0.49	0.17	-1.29	0.06	33.69	0.11	32.92	33.98	27.07	0.09	26.48	27.29								

Table 23: Central Barrow Strait, Microcat/ADCP statistical summary
Complete Record: August 28, 2001 - August 16, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
34	33	-1.60	0.17	-1.78	-0.88	32.25	0.23	31.29	32.75	25.94	0.19	25.17	26.35	4.01	14.59	-40.17	51.89	1.04	6.35	-28.41	34.72
77	69	-1.58	0.13	-1.79	-1.07	32.72	0.12	32.26	32.98	26.32	0.10	25.95	26.53	3.15	14.92	-41.04	55.80	1.04	6.67	-25.19	25.90
157		-1.28	0.12	-1.77	-0.78	33.12	0.13	32.80	33.65	26.64	0.10	26.39	27.05								

Table 24: North Barrow Strait, Microcat/ADCP statistical summary
Complete Record: August 28, 2001 - August 16, 2002

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38 †	39	-1.65	0.19	-1.80	-0.27	32.34	0.39	30.40	32.80	26.01	0.32	24.44	26.39	-0.85	13.62	-74.81	34.45	0.82	4.33	-24.03	20.25
83	75	-1.59	0.12	-1.78	-1.06	32.78	0.11	32.19	33.09	26.37	0.09	25.88	26.62	0.88	13.16	-46.55	36.78	0.73	3.90	-21.08	22.17
160 †		-1.19	0.14	-1.62	-0.66	33.31	0.20	32.57	33.78	26.79	0.16	26.20	27.17								

† Microcat Data Period was Sept 25, 2001 - August 16, 2002 due to late deployment.

Table 25 - Tidal Constants for K1 constituent

South side of Barrow Strait

For ice-free period (Aug 27, 2001 to Oct 10, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	11.56	-1.16	164	9
14	10.94	-1.83	158	2
18	12.06	-1.67	151	4
22	11.15	-0.98	152	0
26	10.33	-0.56	160	356
30	9.72	0.68	155	357
34	8.71	1.52	156	357
38	7.81	2.40	158	356
42	8.10	3.09	163	358
46	8.44	2.94	161	356
50	8.30	2.12	158	352
54	7.69	0.87	154	347
58	7.30	0.27	148	345
62	6.90	0.26	147	345
66	7.09	0.45	153	344
70	7.46	1.02	155	344
72	8.44	0.73	158	341
76	8.33	1.08	158	337
80	7.99	1.56	157	336
84	7.70	1.95	160	336
88	7.71	2.35	162	336
92	7.53	2.82	162	334
96	7.14	3.20	166	335
100	7.06	3.31	171	339
104	7.05	3.24	172	340
108	7.26	3.23	170	336
112	7.57	3.31	166	331
116	7.79	3.47	160	323
120	8.37	3.15	154	316
124	8.64	2.53	148	312
128	9.04	2.28	147	311
132	9.45	1.88	149	310
136	9.25	1.43	153	307

Table 25 - Tidal Constants for K1 constituent (continued)

South side of Barrow Strait

For solid ice period (Feb 1, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.20	1.85	164	325
14	4.79	2.45	168	334
18	5.67	2.24	166	338
22	5.88	2.11	161	337
26	6.12	1.90	156	336
30	6.38	1.88	151	334
34	6.86	1.78	149	332
38	7.40	1.55	149	333
42	7.90	1.34	149	332
46	8.28	1.33	149	330
50	8.24	1.42	149	329
54	8.23	1.47	148	327
58	8.20	1.48	148	327
62	8.21	1.60	148	327
66	8.20	1.75	148	326
70	8.23	1.90	148	324
72	6.84	1.32	152	319
76	7.97	1.47	153	318
80	8.42	1.71	154	321
84	8.71	1.95	152	322
88	8.82	2.07	152	321
92	9.04	2.09	152	319
96	9.02	2.22	152	319
100	8.98	2.27	151	318
104	8.95	2.47	151	318
108	9.01	2.53	152	318
112	9.17	2.62	153	318
116	9.31	2.75	152	318
120	9.46	2.82	152	318
124	9.70	2.80	153	318
128	9.92	2.68	153	318
132	10.18	2.48	155	318
136	10.28	2.26	158	317

Table 25 - Tidal Constants for K1 constituent (continued)

South-central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	11.85	-1.16	160	359
14	11.76	-0.83	155	359
18	13.20	-1.64	151	1
22	13.81	-2.06	151	3
26	13.39	-2.71	155	7
30	12.81	-2.60	157	8
34	12.65	-1.71	155	6
38	12.45	-1.38	152	4
42	12.48	-1.46	152	2
46	12.62	-1.52	152	3
50	12.89	-1.68	151	4
54	13.06	-1.61	151	4
58	13.27	-1.49	152	4
62	12.88	-1.19	153	6

For solid ice period (Feb 17, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	10.75	0.69	171	359
14	11.31	0.06	168	359
18	11.34	-0.25	164	360
22	11.44	-0.55	162	358
26	11.53	-0.70	161	356
30	11.58	-0.63	159	355
34	11.75	-0.69	157	353
38	11.95	-0.73	156	353
42	12.06	-0.81	156	353
46	12.11	-0.91	156	353
50	12.20	-1.08	155	353
54	12.43	-1.16	155	353
58	12.49	-1.21	154	354
62	12.42	-1.22	154	354

Table 25 - Tidal Constants for K1 constituent (continued)

Central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
9	11.43	-1.81	174	358
13	12.10	-1.70	172	359
17	11.80	-1.01	172	1
21	12.49	-1.28	173	4
25	13.33	-2.29	173	6
29	13.09	-2.86	174	5
33	12.37	-2.65	174	4
37	12.39	-2.10	172	2
41	12.89	-1.93	172	2
45	12.63	-2.16	172	4
49	12.55	-2.09	170	5
53	12.24	-2.07	171	4
57	12.10	-1.67	172	5
61	12.07	-1.42	172	5
65	11.99	-1.67	171	5
69	11.96	-1.74	171	5

For solid ice period (Feb 17, 2002 to July 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
9	11.86	-1.57	172	357
13	12.56	-1.42	170	355
17	12.41	-1.74	168	357
21	12.08	-1.86	167	357
25	12.16	-1.91	167	357
29	11.98	-1.90	167	357
33	11.86	-2.06	168	358
37	11.83	-2.09	167	359
41	11.71	-2.14	168	359
45	11.73	-2.21	167	359
49	11.75	-2.31	167	359
53	11.75	-2.32	168	359
57	11.72	-2.31	168	359
61	11.69	-2.33	168	359
65	11.63	-2.33	168	359
69	11.52	-2.30	168	359

Table 25 - Tidal Constants for K1 constituent (continued)

North Side of Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 17, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
11	8.81	0.13	160	340
15	8.66	0.37	162	338
19	8.63	0.70	162	334
23	8.33	1.06	165	329
27	8.74	0.67	167	327
31	9.10	0.03	165	324
35	9.43	0.62	162	315
39	9.71	1.10	161	314
43	9.73	0.89	159	314
47	9.69	0.85	158	313
51	9.32	0.74	160	313
55	9.70	0.88	161	313
59	10.41	0.84	162	313
63	10.75	0.70	162	314
67	10.95	0.57	161	314
71	11.37	0.77	161	315
75	11.78	0.57	161	316

For solid ice period (Feb 17, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
11	6.86	1.44	170	302
15	7.37	1.28	165	301
19	7.75	1.01	161	299
23	8.11	0.66	157	297
27	8.32	0.53	155	297
31	8.35	0.62	154	297
35	8.33	0.81	155	297
39	8.44	0.92	156	297
43	8.58	0.98	157	298
47	8.91	1.02	158	301
51	9.31	0.93	159	303
55	9.63	0.76	159	304
59	9.90	0.73	159	305
63	10.07	0.76	158	306
67	10.26	0.78	158	306
71	10.42	0.78	158	307
75	10.53	0.74	158	307

Table 26 - Tidal Constants for M2 constituent

South side of Barrow Strait

For ice-free period (Aug 27, 2001 to Oct 10, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	7.08	0.47	161	211
14	7.54	0.15	155	203
18	7.55	0.03	152	202
22	7.64	-0.09	151	202
26	8.12	-0.77	150	204
30	8.31	-0.97	154	205
34	8.36	-0.97	154	207
38	8.34	-0.76	154	206
42	8.27	-0.91	154	205
46	8.46	-1.37	154	204
50	8.63	-1.37	155	202
54	8.71	-1.11	157	199
58	8.69	-0.89	157	199
62	8.85	-0.91	156	200
66	9.17	-1.01	154	201
70	9.32	-1.16	152	200
72	9.51	-1.31	163	200
76	9.63	-1.51	162	201
80	9.68	-1.65	161	203
84	9.80	-1.63	160	204
88	9.80	-1.68	158	204
92	9.81	-1.66	157	204
96	9.73	-1.62	158	204
100	9.55	-1.54	158	203
104	9.29	-1.31	159	203
108	8.96	-0.99	160	205
112	8.66	-0.78	161	207
116	8.69	-0.50	162	209
120	8.78	-0.21	163	212
124	8.83	-0.19	167	213
128	8.72	-0.30	171	216
132	8.63	-0.27	176	219
136	8.44	-0.10	180	221

Table 26 - Tidal Constants for M2 constituent (continued)

South side of Barrow Strait

For solid ice period (Feb 1, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.15	2.31	203	251
14	4.52	3.13	159	199
18	4.64	2.88	160	201
22	5.02	2.46	160	203
26	5.50	1.87	162	207
30	6.26	1.17	164	210
34	7.21	0.34	165	211
38	8.18	-0.74	165	212
42	9.24	-1.78	163	212
46	10.05	-2.37	160	210
50	10.51	-2.63	157	208
54	10.66	-2.76	156	205
58	10.74	-2.87	155	203
62	10.89	-2.97	154	201
66	10.96	-3.03	153	200
70	10.88	-3.00	152	199
72	11.48	-2.93	157	201
76	11.31	-3.10	156	203
80	11.36	-3.11	157	202
84	11.18	-2.84	158	202
88	10.53	-2.75	159	200
92	10.20	-2.46	160	201
96	9.92	-2.22	160	202
100	9.65	-1.96	161	202
104	9.46	-1.80	162	203
108	9.24	-1.68	163	204
112	9.09	-1.50	164	205
116	9.02	-1.27	166	206
120	8.98	-1.05	168	207
124	8.82	-0.81	170	209
128	8.56	-0.45	173	212
132	8.26	-0.03	178	216
136	7.90	0.59	183	219

Table 26 - Tidal Constants for M2 constituent (continued)

South-central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	7.17	0.03	168	207
14	7.83	-0.27	165	206
18	7.99	-0.66	162	201
22	8.41	-0.81	160	198
26	8.10	-0.66	158	197
30	7.94	-0.48	158	195
34	8.07	-0.48	158	197
38	8.35	-0.92	159	198
42	8.84	-1.40	160	199
46	9.04	-1.63	158	198
50	9.08	-1.55	158	198
54	9.08	-1.50	158	198
58	9.03	-1.48	158	199
62	8.97	-1.37	160	202

For solid ice period (Feb 17, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.92	3.41	228	254
14	4.07	3.22	211	239
18	4.37	2.87	199	229
22	4.96	2.18	189	220
26	5.85	1.40	184	215
30	6.86	0.42	180	211
34	7.88	-0.30	177	209
38	8.60	-0.75	175	208
42	9.03	-1.00	175	208
46	9.48	-1.39	175	207
50	9.84	-1.80	175	207
54	9.93	-2.03	175	206
58	9.95	-2.08	174	206
62	9.82	-2.01	174	205

Table 26 - Tidal Constants for M2 constituent (continued)

Central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
9	7.82	-0.67	164	190
13	8.18	-0.86	169	191
17	8.48	-1.00	169	194
21	8.83	-1.44	167	195
25	8.97	-1.50	167	193
29	8.89	-1.38	164	192
33	8.84	-1.19	163	191
37	8.98	-1.27	166	193
41	9.15	-1.26	168	198
45	9.17	-1.28	170	200
49	9.22	-1.30	172	201
53	9.18	-1.31	173	201
57	9.13	-1.32	173	201
61	9.13	-1.35	172	201
65	9.28	-1.43	171	200
69	9.38	-1.66	172	200

For solid ice period (Feb 17, 2002 to July 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
9	4.51	2.90	215	243
13	4.75	3.34	183	208
17	5.59	2.20	171	198
21	6.78	1.07	176	201
25	8.27	-0.26	177	201
29	9.34	-1.39	176	199
33	9.96	-2.02	175	198
37	10.24	-2.31	174	198
41	10.41	-2.54	173	197
45	10.60	-2.66	173	197
49	10.76	-2.84	172	196
53	10.88	-2.99	172	196
57	10.96	-3.09	172	196
61	10.98	-3.12	173	197
65	11.03	-3.06	174	198
69	11.00	-3.07	175	199

Table 26 - Tidal Constants for M2 constituent (continued)

North Side of Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 17, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
11	9.15	-1.05	159	180
15	9.22	-1.07	156	178
19	9.55	-1.33	155	175
23	9.55	-1.13	157	174
27	9.28	-0.99	157	174
31	9.05	-0.82	157	176
35	8.74	-0.31	157	176
39	8.32	0.28	159	177
43	8.20	0.51	160	178
47	8.42	0.34	160	178
51	8.71	0.18	159	178
55	8.79	0.11	157	178
59	8.77	0.28	157	179
63	8.55	0.47	158	180
67	8.38	0.53	160	182
71	8.48	0.61	162	182
75	8.42	0.66	164	183

For solid ice period (Feb 17, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
11	5.67	3.32	164	169
15	6.38	2.99	166	174
19	7.10	2.40	167	177
23	7.84	1.63	169	180
27	8.77	0.72	169	182
31	9.60	-0.22	169	182
35	10.09	-0.78	169	182
39	10.31	-0.99	168	181
43	10.42	-1.19	167	179
47	10.36	-1.24	166	178
51	10.23	-1.08	165	177
55	10.01	-0.98	165	177
59	9.85	-0.90	165	177
63	9.74	-0.74	165	178
67	9.60	-0.59	165	178
71	9.44	-0.48	165	178
75	9.28	-0.35	164	177

Table 27 - Tidal Constants for O1 constituent

South side of Barrow Strait

For ice-free period (Aug 27, 2001 to Oct 10, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	4.66	-0.12	161	310
14	5.25	-0.47	161	314
18	5.10	-0.50	155	316
22	4.79	-0.81	156	319
26	4.84	-0.97	159	319
30	4.53	-0.86	159	311
34	4.32	-0.68	161	308
38	4.36	-0.51	164	307
42	4.28	-0.35	163	304
46	3.99	0.10	166	301
50	4.00	0.60	168	300
54	3.97	0.93	171	303
58	3.91	0.94	172	300
62	4.12	0.81	166	294
66	4.44	0.69	160	289
70	4.45	0.63	157	288
72	4.61	0.77	169	288
76	4.40	0.71	166	286
80	4.46	0.48	163	286
84	4.25	0.60	164	284
88	4.32	0.62	161	281
92	4.23	0.62	157	278
96	3.98	0.63	156	277
100	3.86	0.88	156	275
104	3.80	1.16	157	274
108	3.79	1.35	158	274
112	3.87	1.33	160	275
116	3.98	1.32	164	279
120	3.95	1.31	165	280
124	3.94	1.22	166	278
128	4.14	1.18	169	277
132	4.48	1.17	169	275
136	4.45	1.03	170	272

Table 27 - Tidal Constants for O1 constituent (continued)

South side of Barrow Strait

For solid ice period (Feb 1, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	2.80	0.69	163	265
14	3.27	0.69	164	270
18	3.28	0.65	161	273
22	3.33	0.68	159	274
26	3.38	0.70	154	274
30	3.40	0.63	153	275
34	3.35	0.64	152	275
38	3.31	0.58	151	276
42	3.45	0.58	154	278
46	3.75	0.52	156	278
50	3.76	0.53	154	276
54	3.72	0.60	151	275
58	3.67	0.59	149	272
62	3.72	0.54	148	271
66	3.69	0.56	148	269
70	3.67	0.54	147	268
72	5.11	0.53	153	272
76	4.27	0.55	152	275
80	3.92	0.67	146	273
84	3.86	0.59	145	271
88	4.04	0.57	147	269
92	3.76	0.50	146	264
96	3.69	0.49	147	263
100	3.64	0.55	148	263
104	3.70	0.71	149	264
108	3.76	0.84	150	265
112	3.84	0.94	152	267
116	3.88	1.00	153	267
120	3.96	1.03	155	268
124	4.06	1.05	155	269
128	4.16	0.99	156	269
132	4.30	0.97	159	269
136	4.33	1.04	162	268

Table 27 - Tidal Constants for O1 constituent (continued)

South-central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	5.50	-0.74	161	294
14	5.39	-0.89	159	295
18	5.41	-0.87	158	298
22	6.16	-0.71	157	296
26	6.83	-0.61	155	296
30	6.84	-0.62	156	294
34	6.73	-0.62	156	292
38	6.69	-0.52	156	295
42	6.82	-0.52	155	296
46	6.69	-0.29	155	298
50	6.66	-0.28	156	298
54	6.71	-0.14	156	300
58	6.68	0.05	157	303
62	6.64	0.00	157	304

For solid ice period (Feb 17, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	5.15	0.52	170	299
14	5.62	0.38	168	302
18	5.50	0.08	164	303
22	5.47	-0.20	160	303
26	5.46	-0.40	159	302
30	5.54	-0.62	157	301
34	5.56	-0.66	156	300
38	5.61	-0.66	156	298
42	5.63	-0.65	155	298
46	5.72	-0.70	154	299
50	5.77	-0.76	152	299
54	5.78	-0.74	152	298
58	5.79	-0.65	151	298
62	5.76	-0.57	150	299

Table 27 - Tidal Constants for O1 constituent (continued)

Central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
9	6.44	-0.22	164	305
13	6.16	-0.64	164	306
17	6.26	-0.95	169	309
21	6.33	-0.88	171	309
25	6.20	-0.76	168	308
29	6.24	-0.65	165	308
33	6.14	-0.54	165	308
37	6.06	-0.61	166	308
41	5.99	-0.52	169	308
45	6.01	-0.42	170	310
49	6.08	-0.27	170	311
53	6.11	-0.34	172	313
57	6.15	-0.62	173	313
61	6.12	-0.66	172	314
65	5.99	-0.55	172	313
69	5.79	-0.38	171	315

For solid ice period (Feb 17, 2002 to July 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
9	5.32	-0.90	173	308
13	5.87	-0.77	175	304
17	5.87	-0.52	171	305
21	5.73	-0.57	169	306
25	5.66	-0.74	166	305
29	5.42	-0.99	164	306
33	5.42	-1.10	165	305
37	5.56	-1.20	165	306
41	5.61	-1.21	163	306
45	5.63	-1.23	162	308
49	5.69	-1.20	162	308
53	5.65	-1.16	161	309
57	5.67	-1.20	161	308
61	5.60	-1.19	161	309
65	5.54	-1.22	161	309
69	5.48	-1.29	162	309

Table 27 - Tidal Constants for O1 constituent (continued)

North Side of Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 17, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
11	4.72	0.15	164	299
15	4.49	0.11	160	295
19	4.37	0.20	160	289
23	4.10	0.26	161	282
27	4.19	0.56	162	276
31	4.31	0.65	163	276
35	4.61	0.66	168	280
39	4.74	0.58	168	280
43	4.83	0.35	165	276
47	4.83	0.49	165	270
51	4.82	0.59	165	269
55	4.81	0.55	165	269
59	4.87	0.45	164	269
63	4.88	0.25	163	268
67	4.76	0.25	162	266
71	4.42	0.25	161	263
75	4.15	0.40	159	258

For solid ice period (Feb 17, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
11	3.14	1.00	171	255
15	3.24	0.85	164	255
19	3.39	0.64	159	253
23	3.57	0.45	155	250
27	3.76	0.30	152	247
31	3.79	0.29	150	246
35	3.74	0.37	150	247
39	3.66	0.49	154	249
43	3.64	0.55	155	249
47	3.73	0.62	157	249
51	3.89	0.61	159	251
55	4.00	0.55	160	252
59	4.08	0.46	160	253
63	4.13	0.49	161	254
67	4.12	0.50	161	254
71	4.09	0.52	159	253
75	4.14	0.59	158	252

Table 28 - Tidal Constants for P1 constituent

South side of Barrow Strait

For ice-free period (Aug 27, 2001 to Oct 10, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	4.19	-0.31	168	15
14	4.31	-1.83	163	1
18	6.16	-2.70	150	7
22	5.48	-2.00	156	359
26	4.67	-0.56	172	352
30	3.88	0.76	160	354
34	3.32	1.26	150	344
38	2.87	1.62	129	322
42	2.74	2.39	101	297
46	2.70	2.37	130	330
50	2.50	1.62	146	348
54	2.07	0.42	143	340
58	1.96	-0.45	134	329
62	1.65	-0.64	127	317
66	1.57	-0.21	141	301
70	1.84	0.09	137	306
72	2.43	-0.09	134	323
76	2.42	0.00	137	311
80	2.03	0.16	131	300
84	1.62	0.46	127	288
88	1.51	0.87	123	281
92	1.64	0.98	107	263
96	1.94	0.98	91	241
100	1.99	0.91	78	227
104	1.99	0.67	66	214
108	1.87	0.90	77	214
112	2.08	1.18	105	241
116	2.77	0.89	123	257
120	3.26	0.52	133	266
124	3.30	-0.20	135	271
128	3.53	-0.41	133	272
132	3.63	-0.45	140	272
136	3.70	-0.34	154	265

Table 28 - Tidal Constants for P1 constituent (continued)

South side of Barrow Strait

For solid ice period (Feb 1, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	2.70	0.51	185	17
14	3.01	0.52	178	11
18	2.69	0.77	167	357
22	2.69	0.69	159	353
26	2.74	0.67	154	352
30	2.83	0.72	152	354
34	2.80	0.79	152	352
38	2.60	0.70	154	346
42	2.45	0.59	155	341
46	2.39	0.56	153	332
50	2.38	0.54	150	328
54	2.41	0.48	148	327
58	2.34	0.52	146	323
62	2.18	0.55	144	323
66	2.19	0.55	145	324
70	2.21	0.61	146	322
72	3.31	0.72	163	357
76	1.62	0.66	151	316
80	2.51	0.68	144	308
84	2.41	0.76	136	305
88	2.30	0.85	130	302
92	2.51	0.78	130	298
96	2.53	0.77	132	298
100	2.69	0.83	135	299
104	2.82	0.95	137	299
108	2.86	1.00	137	298
112	2.94	1.07	138	298
116	3.08	1.14	141	300
120	3.13	1.15	142	301
124	3.36	1.14	146	304
128	3.59	1.12	148	305
132	3.77	1.05	150	305
136	3.78	1.04	154	303

Table 28 - Tidal Constants for P1 constituent (continued)

South-central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.25	-0.37	154	351
14	3.65	-0.60	142	350
18	5.38	-1.14	140	6
22	5.78	-1.56	142	10
26	4.87	-2.09	152	18
30	4.54	-2.19	159	15
34	4.46	-1.52	150	12
38	4.18	-1.35	147	4
42	4.13	-1.45	149	1
46	4.12	-1.50	150	3
50	3.83	-1.59	146	10
54	3.57	-1.35	146	10
58	3.60	-1.18	150	11
62	3.45	-0.97	152	13

For solid ice period (Feb 17, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.58	0.47	177	14
14	3.82	0.65	165	4
18	4.30	0.44	160	1
22	4.38	0.17	158	357
26	4.29	-0.34	159	352
30	4.08	-0.34	160	351
34	3.98	-0.14	158	350
38	4.05	0.02	158	351
42	4.17	-0.12	156	350
46	4.33	-0.22	155	349
50	4.50	-0.28	154	348
54	4.63	-0.41	153	348
58	4.69	-0.54	153	349
62	4.67	-0.50	153	349

Table 28 - Tidal Constants for P1 constituent (continued)

Central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
9	2.79	-0.63	170	340
13	3.99	-0.83	168	346
17	3.50	-0.15	164	347
21	3.66	-0.08	169	352
25	4.28	-1.12	174	358
29	4.52	-1.60	181	356
33	4.35	-1.26	184	352
37	4.45	-0.91	179	349
41	4.80	-0.88	179	352
45	4.31	-1.00	182	351
49	4.10	-1.09	175	352
53	4.00	-1.00	176	346
57	3.66	-0.52	176	348
61	3.64	-0.45	173	348
65	3.59	-0.90	171	347
69	3.60	-0.95	174	345

For solid ice period (Feb 17, 2002 to July 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
9	2.08	-0.09	183	15
13	2.27	-0.83	180	12
17	2.59	-0.37	172	357
21	3.10	-0.48	165	355
25	3.34	-0.45	163	351
29	3.42	-0.51	162	354
33	3.52	-0.74	160	355
37	3.60	-0.76	163	355
41	3.64	-0.77	163	356
45	3.75	-0.77	159	358
49	3.80	-0.84	159	358
53	3.87	-1.01	160	357
57	3.95	-1.03	160	358
61	3.93	-0.97	160	359
65	3.86	-0.97	162	358
69	3.85	-1.00	162	358

Table 28 - Tidal Constants for P1 constituent (continued)

North Side of Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 17, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
11	2.13	-0.48	165	334
15	2.56	-0.79	167	333
19	2.84	-0.49	170	325
23	2.60	0.07	174	323
27	2.91	-0.36	181	323
31	3.28	-0.65	182	311
35	3.62	0.15	172	296
39	3.71	0.50	165	291
43	3.57	0.09	167	289
47	3.65	0.21	165	288
51	3.36	0.36	162	285
55	3.35	0.63	159	287
59	3.71	0.67	163	296
63	3.81	0.46	166	301
67	3.85	0.28	165	303
71	4.10	0.48	161	305
75	4.26	0.28	160	311

For solid ice period (Feb 17, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
11	1.74	0.83	181	310
15	1.80	0.87	177	307
19	1.71	0.87	173	305
23	1.67	0.82	163	295
27	1.65	0.76	155	289
31	1.74	0.66	156	291
35	1.69	0.65	159	293
39	1.69	0.65	166	298
43	1.74	0.75	167	301
47	1.94	0.78	167	305
51	2.34	0.56	168	310
55	2.59	0.37	168	311
59	2.77	0.29	168	312
63	2.87	0.33	166	313
67	2.92	0.31	165	312
71	3.06	0.26	164	312
75	3.12	0.21	164	312

Table 29 - Tidal Constants for S2 constituent

South side of Barrow Strait

For ice-free period (Aug 27, 2001 to Oct 10, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.72	0.01	137	236
14	4.16	-0.28	134	234
18	4.42	-0.56	138	246
22	4.51	-0.84	146	254
26	5.15	-0.93	152	252
30	5.37	-1.14	152	248
34	5.31	-0.93	149	245
38	5.14	-0.48	149	245
42	5.03	-0.49	147	245
46	4.89	-0.59	146	246
50	4.86	-0.69	147	246
54	4.61	-0.67	151	246
58	4.28	-0.46	151	247
62	4.15	-0.31	151	248
66	4.20	-0.26	153	248
70	4.25	-0.10	154	249
72	4.57	-0.31	162	250
76	4.58	-0.28	159	249
80	4.53	-0.39	158	251
84	4.62	-0.38	159	254
88	4.61	-0.37	157	253
92	4.73	-0.23	155	252
96	4.62	-0.21	153	253
100	4.54	-0.14	153	252
104	4.66	-0.09	154	255
108	4.83	-0.19	157	258
112	4.90	-0.47	159	259
116	5.04	-0.74	160	261
120	5.18	-0.94	162	261
124	5.33	-1.06	165	259
128	5.16	-1.08	166	260
132	4.90	-0.79	169	266
136	4.33	-0.36	175	270

Table 29 - Tidal Constants for S2 constituent (continued)

South side of Barrow Strait

For solid ice period (Feb 1, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	1.12	0.53	47	151
14	1.41	0.75	95	184
18	1.73	0.67	115	200
22	1.94	0.64	119	201
26	1.87	0.79	128	212
30	1.81	0.82	151	240
34	2.26	0.42	165	256
38	2.87	-0.09	166	259
42	3.37	-0.59	165	259
46	3.82	-0.89	164	258
50	4.09	-1.05	164	257
54	4.31	-0.98	163	254
58	4.42	-0.91	162	252
62	4.37	-0.90	161	252
66	4.35	-0.95	161	251
70	4.27	-1.02	161	249
72	2.98	-1.34	168	247
76	2.58	-1.29	163	248
80	3.43	-1.28	167	245
84	3.80	-1.38	164	244
88	4.30	-1.18	161	251
92	4.13	-1.03	160	244
96	4.08	-0.90	160	242
100	3.97	-0.78	160	243
104	3.83	-0.69	162	244
108	3.70	-0.60	163	245
112	3.66	-0.54	163	246
116	3.61	-0.44	165	248
120	3.53	-0.39	169	251
124	3.41	-0.35	172	254
128	3.26	-0.18	177	258
132	3.09	0.04	181	264
136	2.90	0.40	187	271

Table 29 - Tidal Constants for S2 constituent (continued)

South-central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.53	0.04	143	224
14	4.14	-0.62	142	225
18	3.90	-1.19	146	229
22	4.24	-1.28	148	233
26	4.57	-1.40	157	235
30	5.42	-1.77	158	238
34	5.98	-2.22	162	242
38	6.07	-2.36	166	244
42	5.97	-2.28	169	244
46	5.78	-2.09	172	244
50	5.71	-1.95	170	246
54	5.73	-1.98	169	246
58	5.66	-1.92	169	246
62	5.24	-1.74	169	245

For solid ice period (Feb 17, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	1.94	0.80	93	160
14	1.96	0.87	111	177
18	1.78	0.86	122	191
22	1.92	0.87	142	217
26	2.19	0.69	157	232
30	2.50	0.32	165	236
34	2.71	0.09	167	238
38	2.82	0.11	171	240
42	2.95	0.03	171	241
46	3.01	-0.02	173	243
50	3.00	0.03	174	246
54	3.02	0.09	174	246
58	3.03	0.12	176	249
62	3.14	0.03	177	250

Table 29 - Tidal Constants for S2 constituent (continued)

Central Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 11, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
9	5.28	-0.69	152	224
13	5.60	-0.95	160	232
17	5.59	-1.14	165	230
21	5.77	-1.26	168	230
25	5.80	-1.57	171	232
29	5.53	-1.64	174	234
33	5.56	-1.61	175	240
37	5.69	-1.81	178	245
41	5.74	-1.74	181	249
45	5.66	-1.48	183	251
49	5.58	-1.48	184	254
53	5.61	-1.67	186	253
57	5.50	-1.72	187	253
61	5.35	-1.56	188	255
65	5.29	-1.54	189	256
69	5.30	-1.56	191	256

For solid ice period (Feb 17, 2002 to July 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
9	1.91	0.59	91	183
13	2.75	0.11	115	185
17	3.12	0.16	140	206
21	3.35	-0.34	159	227
25	4.03	-0.91	168	235
29	4.49	-1.20	171	240
33	4.62	-1.25	174	244
37	4.61	-1.21	174	245
41	4.52	-1.14	176	246
45	4.39	-1.10	176	246
49	4.34	-1.10	177	246
53	4.47	-1.26	178	245
57	4.53	-1.35	179	245
61	4.51	-1.25	179	246
65	4.49	-1.14	181	246
69	4.41	-1.03	181	247

Table 29 - Tidal Constants for S2 constituent (continued)

North Side of Barrow Strait

For ice-free period (Aug 28, 2001 to Oct 17, 2001)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
11	4.78	-0.27	155	224
15	4.73	-0.44	156	222
19	4.82	-0.78	160	224
23	4.55	-0.76	163	228
27	4.09	-0.45	166	230
31	3.97	-0.31	171	230
35	4.12	-0.42	170	230
39	4.18	-0.56	165	229
43	4.16	-0.54	165	229
47	4.08	-0.28	165	227
51	4.25	-0.14	164	228
55	4.02	-0.08	162	229
59	3.74	0.15	161	227
63	3.50	0.47	160	225
67	3.49	0.70	163	229
71	3.41	0.58	170	233
75	3.71	0.30	172	235

For solid ice period (Feb 17, 2002 to Jul 6, 2002)

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
11	2.52	1.60	151	193
15	2.69	1.42	158	204
19	3.06	1.14	163	212
23	3.60	0.76	167	216
27	4.15	0.23	169	219
31	4.59	-0.25	171	222
35	4.89	-0.64	171	222
39	4.95	-0.75	170	221
43	4.73	-0.76	170	222
47	4.37	-0.61	170	221
51	4.07	-0.42	171	220
55	3.94	-0.20	170	221
59	3.81	-0.20	171	222
63	3.71	-0.17	172	223
67	3.61	-0.14	170	223
71	3.50	-0.05	170	223
75	3.45	-0.04	168	222